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THE SANITARY ENGINEER.

PUBLIC HEALTH · DRAINAGE · WATER SUPPLY · VENTILATION · HEATING · LIGHTING

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AN ANNOUNCEMENT.

At the commencement of the sixth year and seventh volume, the conductor of this journal publicly announces his connection with it. To many of its readers this connection has always been known—to the larger number it will be news.

Favorable circumstances have enabled him to retire from the care of other active interests, and he hopes in the future to be able to devote his time and thought to the journal which he has founded. In thus formally identifying himself with sanitary work, as exemplified in the conducting of THE SANITARY ENGINEER, he is gratifying his tastes and inclination, and yet is taking up an occupation sufficiently practical and remunerative to place it beyond the limits of a merely philanthropic enterprise.

He desires, on this occasion, to acknowledge the fact that to a corps of able and disinterested contributors and assistants much of the credit of the success of this journal is due, and that their advice has been a real help in ways that none but the writer can fully appreciate.

OUR FUTURE NATIONAL HEALTH ORGANIZATION.

No. III.

Referring to our previous editorials for a general statement of the situation, and for an explanation of the views of the Treasury Department, and of the Marine Hospital Service in particular, as to the control of Maritime quarantine, we come now to the position of the National Board of Health on these questions. To understand this position it is necessary to remember that the Board owes its existence to the resistance made by the American Public Health Association to the attempt made by the Marine Hospital Service in 1878-9, to secure control of quarantine matters. The Act creating the Board was passed in the face of the most strenuous opposition on the part of the Marine Hospital Service, and the only thing which it contained about quarantine was the direction that the Board should investigate the subject and report its conclusions. Those who urged the passage of the Act had much more faith in the possibility of promoting public health interests by investigations into the causes of disease, and by urging cleanliness, pure water, proper sewerage, etc., than they had in quarantine; and in fact subsequent events showed that some of them had placed too low an estimate on the value of quarantine inspections, especially against yellow fever.

After the Board had been in existence about two months, the present so-called Quarantine Act was passed. This directs the Board to *aid* State and local boards to enforce *their*, not *its*, regulations. So far as we can learn, the attitude of the Board towards this Act, while it was under discussion in Congress, was passive; it neither urged nor opposed it, although when formally consulted with regard to it, it suggested some modifications, and may therefore be considered to have given it a tacit approval. This Act is to remain in force only four years, and therefore expires next June.

It is not our purpose to give an account of the work of the Board; space being wanting for even the most condensed summary. It is sufficient to say that its operations under the original Act, have received the approval of all scientific men, sanitarians and physicians of the country, and that its work under the Quarantine Act is fully endorsed by the American Public Health Association, the Sanitary Council of the Mississippi Valley, and by every State and Local Board of Health or quarantine authority in the United States, with the exception of three only. The chief objector to the quarantine management of the National Board is the State Board of Health of Louisiana; and this is in part due to a personal quarrel, and in part to the fact that the revenue of the local board is mainly derived from the tax on vessels, which is collected at its quarantine establishment, and that therefore it is unwilling to make any change which would involve the diminution of its funds.

It is, however, our deliberate opinion that the hostility of the Louisiana Board, and the peculiar style in which it has been manifested, has, on the whole, rather helped than hurt the National Board. The great majority of the leading business and professional men of New Orleans as represented in the Citizens' Auxiliary Sanitary Association, the Medical Society, the Cotton Exchange, etc., condemn the position of the Louisiana Board in a very decided way, and approve that of the National Board.

But if the operations of the National Board meet with this very general approval on the part of those most competent to judge, how comes it that it has met with such hostile criticism in the daily press and in Congress? We have in part already explained this in describing the attitude of the Treasury Department, and of the Marine Hospital Service. The most influential opponent of the National Board has been, and no doubt is, Judge French, the Assistant Secretary of the Treasury; in fact, the supervisor of the Marine Hospital Service derives all his support from this source.

Judge French is a strong believer in a National Quarantine, and thinks that the United States should have charge of this service, by means of its own officers, in all ports; he believes that this should be under the entire control of the Treasury Department, and that the National Board is the result of an outburst of sentimental philanthropy, which has had its day, and should now give place to practical control of the matter by Government officials.

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While the Secretary of the Treasury changes with the administration, the Assistant Secretary does not, and all matters relating to the National Board, as well as to the Marine Hospital Service, are decided by Judge French.

The cool or hostile attitude of the press, so far as we can learn, is in part due to the influence of the Treasury Department and the Marine Hospital Service, whose chief has never underrated the value of newspaper influence, and to the further fact that the late Secretary has offended some of that very influential body of men, the Washington correspondents, and has probably taken no special pains to conciliate any of them.

When to these causes we add the enmity of a few disappointed candidates for office, and the fact that the great majority of members of Congress are profoundly ignorant of and indifferent to the whole subject, and therefore follow blindly the lead of the Committee on Appropriations, which at present has at its head a special friend of the Treasury Department, the troubles of the National Board of Health are not so much to be wondered at.

Having thus briefly, but we hope with sufficient clearness, explained the situation, we will in our next number, consider what it is best to do about it.

THE STREETS OF NEW YORK.

The most busy streets in the lower parts of New York City have been for several months past in the hands of three private corporations, who have torn up the pavements and obstructed travel as it suited them. They have done their work, to be sure, in outward compliance with the forms of law, under the sanction of resolutions passed by the Common Council and of permits duly granted by the Department of Public Works. The work has been done presumably under the supervision of inspectors appointed by the municipal authorities, to see that no injury was done to the property of the city, and the workmen have been protected and the public interests guarded during the progress of the work by the city police. The interests of the companies themselves have been guarded by civil engineers of high reputation, and by inspectors who might be supposed to use every effort to protect their employers and the public from injury, expense, and inconvenience. Yet the whole operation has been bunglingly managed.

As regards the convenience of the public, who have the prior right to the free use of the streets, every one concerned seems to have ignored it entirely. The pavements of the most constantly used streets in the city have been torn up and replaced three times in succession to lay down three sets of pipes by three different companies, neither one of which apparently knew where the others had laid or proposed to lay their pipes, or had any definite ideas in advance of opening the trenches, what they proposed to do themselves. All this was bad enough in itself, but it is not the worst. In a number of places the streets have been torn up to correct defects in fittings and to discover the cause of imperfect insulation of the electric light wires, and there is every reason to apprehend that this nuisance will become chronic. The frequenters of the section of the city embraced within the present range of the steam heating and electric light companies will have to bear their discomforts as best they can. But before any extensions of the system are permitted, the owners of property will do well to demand certain radical changes in the methods pursued.

At the very root of the whole evil is the vile system of patronage, political and social. In every company which procures a franchise to occupy the streets the services of some influential professional politicians are secured. The support of some contractor of means and political influence is also obtained. It is not always necessary to pay out hard cash to public officers to secure favorable consideration, but in most instances a pledging of a share of the patronage is indispensable. That is to say, it must be understood that certain mechanics, laborers, inspectors, overseers, watchmen and so forth, shall be employed and retained on the work whether their services are valuable or not. There is a large multitude of such men in the city of New York, whose votes and tongues, and sometimes fists, are valuable to the petty politician, and to him they look for support. Those men will not do good work even when they know how to. Their employer dare not discharge them even when he knows they cost him more than they are worth, for their discharge would bring down on his head the wrath of a succession of men of "influoence," and the result would be—no more contracts. There is not in the city of New York a single foreman, contractor, inspector, civil engineer or head of a department, who can deny that this is true, and that he has under his control, nominally, men whom he knows to be inefficient or negligent, but whom he dare not remove, or hardly reprove. It goes down the whole scale from the top to the bottom. The result is bad work somewhere, in spite of every effort of the conscientious, faithful, earnest workers.

The worst specimens of the "dead beat" are found among too many of the inspectors appointed by the city departments. A contractor's employés are not to be expected to do their best work at all times. They have no special interest in the work. A contractor cannot be expected to be very strict in requiring perfection, if it costs a little more and what is done will pass the inspector. But the inspector should be capable, honest and efficient, and subject only to the engineer. A broken-down mechanic or a political bummer is not fit for such a position. Everybody will acknowledge this, in the abstract, and yet such men constitute a majority of the appointees of any city department as inspectors of public works.

Now we venture to say that if Mr. Buel and Mr. Emory, the Engineers-in-Chief of the two steam heating companies, had been given, as they should have been, full charge of the work of fitting and laying the pipes, with absolute authority to remove at once any man detected in slighting his work, and to appoint and discharge inspectors, there would have been no settlement of pavements, and very little blowing out of joints. It is all nonsense to talk of the impossibility of refilling trenches so that pavements will not settle. It can be done, it has been done, and it should be done every time. It would be done if a contractor was fined fifty dollars for every settlement after he left the work.

The companies should also be required to act in concert, to prepare beforehand plans of their proposed structures, and to put them in all at the same time in the same block. There need be no difficulty about this. It would save time in the end, and save money, not to speak of the inconveniences to the public. We believe that the three companies now engaged in ruining the tempers and injuring the property of the people in the down town streets, would have wasted less of their money if they had agreed to work together, and have taken up the streets section by section, and put their pipes and those they found in a subway of masonry. As it is, their operations have made them a public nuisance, and though it may be true that the New York Company has met with fewer accidents and has incurred a greater expense in order to reduce to a minimum the mishaps that seem inevitable even under the best management, and admitting that the engineers of the American Company have been forced to adopt cheaper methods of construction, and let the work out to sub-contractors, in order to bring the expenditures within a limit to satisfy investors, and that most of the mishaps thus far have been with their pipes, yet the public will not discriminate so long as they feel outraged.

The question now arises, what is to be done? The facts are, that in addition to the repeated digging up, in order to get at the present pipes to which New Yorkers will have from time to time to submit, we are certain to have more steam and electric light companies organized if these ventures prove profitable, or if speculators think they can float a company on a plausible prospectus. Notwithstanding the fact that there are three sets of gas pipes in some streets, another company is asking the authorities for permission to lay down still another line of gas mains. It is, therefore, high time to cry a halt, and if the authority does not now exist, a legislative enactment should be procured this winter, providing for placing under suitable restrictions and conditions, in properly constructed brick subways, all pipes to be hereafter laid. Until such a provision is made, and this pipe-laying can be done in some rational, comprehensive manner, not another length of it should be allowed to be placed under our streets. We commend this suggestion to the Committee of Twenty-one.

MORE DANGEROUS WORK.

In the year 1878 public attention was called to the character of the plumbing contained in some apartment houses situated in East 52d street in this city. Through the efforts of Doctor T. G. Thomas, several of whose patients, living in one of these houses, had been ill with diphtheria and one or more of whom had died of that disease, an investigation was made of their sanitary condition and appliances.

The notorious Charles A. Budenseick was the builder of them, and the contracting plumber was Charles D. Lamarche, of No. 254 East 74th street.

Budenseick published an affidavit made by Lamarche, in which he stated that the plumbing had been done in a thorough, sufficient, and workmanlike manner in these houses, and we ventured the comment that had Lamarche sworn he had done as much work as he could afford to do for the price paid by Budenseick we should have been inclined to believe him, but under all the circumstances we could reach only the conclusion that Lamarche was either guilty of most rascally work in the plumbing of these houses, or was entirely ignorant of what constituted efficient sanitary plumbing, and, upon either horn of the dilemma, he should not be permitted to do plumbing work in this city and that his license should be revoked forthwith.

Budenseick was indicted under the Sanitary Code for this work, and was tried in Feb., 1880, but under the law as it then existed criminality could not be fastened upon him.

Lamarche working for this same Budenseick has recently come into similar notoriety again, and in view of the antecedents of these two men their practices demand some public consideration.

Our representative, in verifying the report of one of the health inspectors regarding the violations of the new sanitary and plumbing law, discovered some dangerous work done in the five apartment houses, No. 286 to 294 East 97th Street, in this city. Budenseick was the builder and Lamarche the plumber, and we are informed by the present owner that the plumber had agreed to do his work strictly in accordance with the regulations of the Board of Health, but how near this standard was attained may be learned from the following description of the sanitary arrangements in these houses.

"The traps of the closets and sinks on the top floor were not ventilated. Those on the floors below were ventilated into 2-inch iron pipes running up in the partition wall alongside the soil pipes, which they enter above the highest fixtures. Just below the junction of the air and soil pipes, and just beneath the level of the water closet seat, is a double T, thus, on the air pipe (presumed to have been left to receive vents from the closet and sink traps). The closet and sink are separated by the partition in which the soil and air pipes run. The sink is in a living room, and the closet in a small room at the end of the hall, with a window behind it, to the open air. In

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every house the hub of the air pipe entering the space under the closet was open, and the opposite hub opened into the enclosed space under the sink in three of the five cases. In the other two, where the houses were occupied, the opening into the living room had been closed by plaster. The safes under the closets were simply sheets of lead with the edges turned up, but not soldered. In one case the closet had been leaking into the safe and the water had escaped into the space between the floor and ceiling below at a place where the edge had been turned down. In this house the occupant said there was a constant dropping through the night of water from the cistern overflow which discharged over the kitchen sink. In another house, the flushing apparatus (a valve on the closet supplied from an ordinary small cistern) was not in working order, and the smell was very offensive from the opening into the vent pipe. With some difficulty the flushing was made to work, and then it would not stop, though the valve rod was in the position in which it should be closed."

The only water closet trap our representative was able to see was connected to the Y branch by being run inside of what seemed to be an iron ferrule, no solder being used.

From the testimony at the trial of Budenseick, it appeared that Lamarche employed men to do plumbing work who were utterly incompetent. From the statements of the Inspectors in whose districts he now carries on operations, his record is that of a man who does 'skin work." There is no shadow of doubt that he is a conspicuous example of the class of men who take large contracts from the Budenseick class of builders, and speculate on the extent to which they can skin a job and not get caught by the Inspectors; and when caught, simply do what they are obliged to. We think, therefore, when the Board of Health are causing the work of a man, with a reputation such as that of Lamarche or Budenseick, to be inspected, their duty can only be fully performed when the covered work is as carefully examined as that which is uncovered; and that in this particular instance, the casings should be removed and the entire plumbing work disclosed in every one of the numerous houses in which recently Lamarche has been the contracting plumber and Budenseick the builder, whether in their own name, or in that of some other party. Hitherto, the Board having shown a disposition to be lenient, their Inspectors very naturally have been reluctant to destroy casings and uncover work, and have undoubtedly, as in dealing with men of good reputation, taken some things for granted.

If the Board propose to allow men of this character to do plumbing in this city, their Inspectors must be able to vouch for the soundness of every foot of work done. It will, indeed, be a crying shame if the experience of the East 52d street houses must be repeated before such a survey is made, as the safety of the future occupants of these houses makes imperative. In this connection we invite attention to the illustration of dangerous work discovered in Washington by the Plumbing Inspector of that city, whose report we elsewhere print.

THE SEWERAGE OF BRIGHTON.

The London *Lancet* of November 4 contains a long report by Dr. B. W. Richardson upon the sanitary condition of Brighton, concerning which there has been much controversy during the past summer. Dr. Richardson was employed by the town authorities, who, of course, desired a favorable report, and from the number of persons and institutions eulogized it is evident that the good-natured Doctor has done his best to please his clients. He concludes that the unusually high mortality of Brighton during the first half of the present year was due to measles, scarlet fever and whooping cough, to which should be added an undue prevalence of typhoid fever in 1881. This last he finds to have been mainly due to a contaminated milk supply. The undue prevalence of the other diseases named, he thinks, was due to the fact that for about eleven years the town had been unusually free from these diseases, thus allowing time for the birth and growth of a large population, unprotected by previous attacks, and therefore susceptible to their influence. He concludes that Brighton is singularly free from the influences of sewer air, and his line of argument will be found extremely useful by those municipal authorities who have to defend the reputation for healthfulness of their respective localities, no matter what the facts may be. For instance, he investigated a case of diphtheria, and gives the result as follows:

"She was believed to have been exposed to a bad odor from the ventilator of a sewer, but I found the most contradictory statements as to the character of the odor, and even as to the existence or non existence of an odor. Further, although I was informed that five cases of sore throat had occurred some weeks before in the same house. I could trace no other case of diphtheria in any other house near the ventilator. * * * I have seen so many cases of diphtheria, in children predisposed to the disease, coming on from cold after exposure to fatigue and wet without any suspicion of exposure to sewer air that," etc., etc.

Evidently it would have taken a good deal to have satisfied Dr. Richardson that anything was due to sewer air in Brighton.

He states very emphatically his preference for the separate system of sewerage, but as Brighton has the combined system he has softened his objections to it into the following very tepid statement. "The angers presumed to be attendant upon the present system are," etc. "It is assumed that the sewer gas will escape." If Dr. Richardson had been speaking from an entirely independent stand-point we do not think he would have put it in this way.

But while this report, as regards the actual condition of Brighton, can only be considered as a piece of special pleading, some of his recommendations are suggestive and valuable. Among these we note the following:

"3. I should carry out the medical officer's suggestion to establish in the eastern and western parts of the town a mortuary, so that the dead in the smaller and crowded tenements of the living may be immediately removed. Connected with these mortuaries I should build a court room for the service of the coroner in his judicial investigations.

"4. In four different parts of the town I should erect a series of workmen's workrooms, in which no family should be allowed to live, but in which any person engaged in indoor work, such as tailoring, shoemaking, and the like, should be able under proper supervision, to hire a workroom for a small sum per week. By this means the dissemination of disease by clothes and other articles made in rooms where the sick, dying and dead are lying would be prevented.

"5. The present public baths, established some years ago on the recommendation of Mr. Councillor Wood, are performing a most important service, and, as I found on inspection, are admirably carried out, and are doing an excellent business. They are, however, altogether inadequate for the wants of the town. I should extend these fourfold at least. The temptation they offer for personal cleansing extends to cleanliness all round—in clothing, in cooking utensils, in the house, in the mind. I am quite certain that this one further improvement would reduce the annual mortality another one in the 1,000 in Brighton.

"6. In connection with the baths I should build wash-houses and public laundries. The present system of laundry work in Brighton is not so bad as it is in many towns, for, as described in a preceding page, there are two good semi-public laundries. At the Grand Hotel there is also a model laundry in which an inquirer, if he be as favored as I was by the managers there, may see the perfection of rapid washing, drying, ironing, mangling, and folding of every variety of clothing. This would be the model of the public laundries; and if they were erected another source of danger always imminent—namely, the conveyance of the poisons of disease by infected clothing would be prevented. In each of these establishments a heat disinfecting chamber for the reception of dangerous clothing would readily find its place and would be of persistent usefulness.

"7. I should second most earnestly the recommendation of Dr. Taaffe for the erection in the town, in such portions as he would know to be best, of small public lavatories and water closet conveniences for passengers of both sexes on what is known as the châlet principle. These conveniences would be essentially healthful, and would more than pay for their own cost and maintenance.

"I should recommend the removal of all the cowsheds from the town itself, and until they can be replaced by model farm dairies, should reduce them largely in number, place them outside the town, and have them so convenient for inspection that they can be under constant surveillance. In all the milk stores I should also insist that the constant water supply was laid on. That a reduction in mortality would follow these improvements in the town of Brighton is absolutely certain. The typhoid milk epidemic of last year is a sufficient intimation of itself on this matter. It is not in the least a sanguine view to estimate that another saving of one life in the 1,000 annually would reward this important change in the present system, besides giving the assurance to the world at large that in Brighton, a town of schools, the young who go there would have in the purest form the most common and important food for the springtime of life."

A further recommendation "to enormously increase the present ventilation" to the road surface by additional man-holes, to be arranged also as flushing shafts, is good. If this suggestion is carried out we think a following one, namely to trap the higher sewers from the lower ones, would be of no benefit, and might, in fact, cause trouble from deposits, obstructions to the flow, and in storms form undue air pressure unless these traps are properly ventilated. He also recommends pumping the sewage at Roedean furnace from the Brighton section of the sewer, at high tide, directly into the sea. To do this would place the discharge of much of the sewage more than two miles nearer the town than at present. We think a better plan would be to pump it into the Portobello section of the intercepting sewer itself, shutting down the necessary penstocks, and thus, under a slight pressure, which could not be objectionable, discharge at Portobello freely at all times.

However pleasing to the people of Brighton this report will be, and notwithstanding its valuable suggestions, we are of the opinion that it will ultimately prove an unfortunate one, if steps are not at once taken to remedy the grave defects in the sewerage system admitted by Sir Joseph Bazalgette, and which are known to exist.

A writer in the London *Lancet*, in an article on "Canadian and American Hotels," warns his countrymen against the danger of a lengthened stay in our hotels. He says:

"With few exceptions, these hotels have fixed wash-basins, with hot and cold water laid on, in the majority of the bedrooms, and very frequently a bath and other convenience in addition. In the private houses of wealthy Americans, who are favorable to luxurious living, this same system is almost universal. An examination of many of these basins and of the plumbing arrangements has brought to light the fact that they are frequently untrapped, and that when traps are used, they are of a bad pattern, and calculated to create danger to the health of the occupant of any room or house where they are placed. A few weeks ago, a correspondent of *The Lancet* was placed in a bedroom where there was a fixed basin which communicated directly with the sewer without any intervening trap. He was made seriously ill by sleeping one night in this room with the windows wide open; and although he placed the plug in the basin and filled it with water, the whole of the water was sucked out through the waste pipe during the night, and the room filled with sewer gas. At the end of September another visitor was equally poisoned, and he found the waiters in the dining-room engaged in making a careful search for an escape of sewer gas, which was painfully apparent in that apartment. Remonstrance at the office of the hotel elicited the remark from the clerk in charge that he feared the sewage must have bubbled over again, but he was unaware that the basin was untrapped. Inquiry showed it was the common report that in some cases the sewage had forced its way into the basins in the bedrooms. It is not too much to say that it is dangerous for any adult to reside in an hotel with such imperfect sanitary arrangements, and that the air of the room would not improbably cause death to a delicate child. In very many hotels in America and Canada, bottle or cesspool traps are used under the basins, in which the sewage ferments, and so sewer gas is liable to be generated in every room which has a fixed basin. We must warn travelers to be careful before retiring to bed or remaining for any length of time in an hotel where the arrangements are as we have described. It would be a public service for one of our contemporaries in America to fearlessly expose this great danger to the public health."

There is no doubt that the condition of many of our oldest hotels is as above stated. We must,

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however, be permitted to doubt the wonderful phenomenon of the water in a wash basin being sucked through the stopper, or overflow holes, by a syphoning action in the waste pipe. A force competent to do this would have bent the faucets or sucked them off the slab. It is more likely that the stopper used in that particular basin came from an assortment generally kept by the so-called hotel plumber, which rarely fit the socket, and the water leaked out. The rest of the indictment our hotels may have to plead guilty to ; but this one is too much.

The Board of Health of this city have approved an amended form of plumbing specifications. This, with our page of patents and an illustrated article describing the Edison system of wiring the Mills' building for their incandescent light, has been crowded out of this issue and will appear in our next.

SANITARY ARRANGEMENTS IN THE RESIDENCE OF MR. CORNELIUS VANDERBILT.

(Continued from VOL. VI., page 535.)

IV.—PLUMBING WORK IN THE KITCHEN.

The kitchen in this house contains a large amount of plumbing work. In it, or connected with it, are some features peculiar to this place, or at least such as we have not before described.

An account of these will, we think, be interesting to our plumbing readers. The sketch on the opposite page shows the arrangement of the greater part of the work. One of the most striking peculiarities seen in it is the location of

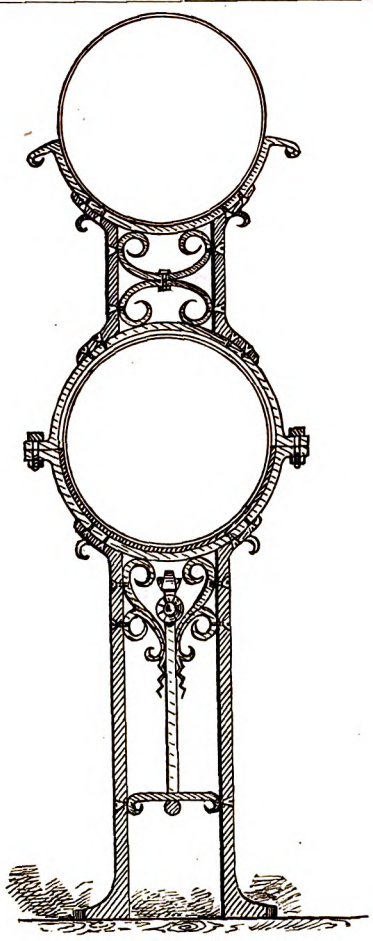

FIGURE 1.

the range. Instead of being placed against the wall between brick piers, under the chimney or very near it, it stands out in the room two feet or more from the wall behind, and at a considerable further distance from the chimney, which is on the right hand beyond the end of the range.

Another novel feature is the method of supporting the horizontal boilers. They are usually suspended from the ceiling, but here they are supported from the floor, resting in nickel plated iron frames of an ornamental pattern shown in Fig 1. The boilers—one for street and one for tank pressure service—are of heavy copper, with riveted heads. Each is connected with two water-backs, so arranged that both boilers may be heated from either of two fire-boxes, or either boiler alone heated from either fire-box. The upper boiler is supplied from the street pressure and furnishes hot water for all the baths, basins and sinks below the third floor. The lower boiler is supplied from the tank and furnishes hot water for fixtures above the third floor. Those on that floor may be supplied from either, as explained in the first article—on the water supply. The supply pipe to the street pressure boiler is connected with that to the tank boiler by a pipe having in it a valve opening toward the latter, so that if the tank supply should fail, the tank boiler will fill from the street pressure ; or, by a stop cock on this connecting pipe, the tank boiler may be shut off entirely and the street supply only used. Vacuum pipes are connected with the hot supplies from each boiler to prevent any danger of collapse in case the supply fails. These join and enter the sediment pipe below the stop cock on it, thus furnishing an air inlet if there should ever be need of one. A valve on each pipe above their junction, opening inward, prevents the loss of water from either under normal conditions.

The following is an explanation of the lettering on the sketch : *a*, the street pressure boiler ; *b*, the tank pressure boiler, each about 150 gallons capacity ; *c*, the supply to the street pressure boiler, 1¼-inch, passing around through the outer divisions of three sink grease traps before entering the boiler ; *d* (1-inch) from the

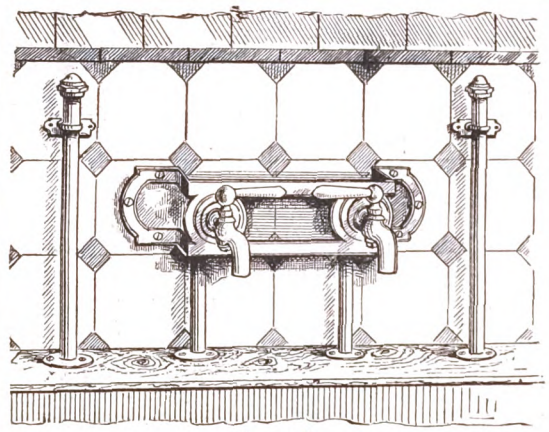

FIGURE 2.

boiler *a* to a water-back in the right hand fire-box ; *e* (1¼-inch), return from the range to the boiler ; *f*, 1¼-inch, hot supply from the street pressure boiler, passing both to the upper floors and to the cellar ; *g* (¾-inch), return circulation to this boiler ; *h* (1-inch), the cold water connection from the same boiler with a water-back in the left hand fire-box ; and *i* (1¼-inch), the hot water return to the boiler. The (1¼-inch) pipe *k* is the supply to the tank boiler *b* ; *l* (1-inch) is the cold water connection of this boiler with the other water-back in the left hand fire-box ; *m* (1-¼-inch), the hot water return ; *n* (1¼-inch), the supply from the tank boiler going direct to the division cock on the third floor, and *o* (¾-inch), the return circulation. The other water-back in the right hand fire-box is connected with the same boiler by the pipes *p* (1-inch) and *q* (1-¼-inch). The vacuum pipes *r*, *r* (¾-inch), join and enter the sediment pipes below their junction. The latter are behind the range and not seen ; there is one for each boiler, being a ¾-inch branch from one of the two pipes leading from each boiler to the range. The combined sediment and vacuum pipe terminates over a sink in the cellar. The connection between the street and tank supplies, spoken of above, is marked *s*, and is 1-inch.

The remaining letters apply to the pipes under the enamelled iron sink at the left of the range : *t* is the entrance of the cold water pipe (supplying boiler *a*) to the outer part of the grease trap *u*, and *v* its exit ; *w*, *w*, is the waste (2-inch), forming a deep trap, and *x* the air pipe to prevent syphoning ; *y* is the hot water supply to the sink and *z* the cold, both ½-inch.

In a corner of the room, in front of the range, is a deep pot sink, of tinned and planished copper (not seen in the sketch) This has the same kind of grease trap on the waste. This sink is so deep and the bottom consequently so near the floor that there was not room to put the grease trap above it. Accordingly a hole was made large enough for it, through the brick and concrete floor and lined with an iron casing or box. The boiler supply water is passed around the grease trap in this way : the main line runs along beneath the floor (suspended from the ceiling of the cellar) past the location of the trap above. Directly opposite the trap a stop cock is placed on the main line and a branch, taken off on one side, passes through the trap and comes back into the main line on the other side of the stop cock when the latter is closed. If it is open and those on the branches closed i flows straight past. It may be well to explain here, for the benefit of those who have not seen this grease trap or a description of it, that the water is thus made to circulate around it (through an annular space entirely separated from the interior) for the purpose of cooling the collected grease and causing it to solidify. The supply to the boiler is chosen to effect this object because, not only is there no objection to thus slightly warming the water, but it is actually so much saving of heat.

Figure 2 shows the wall back of the pot sink and how the cocks are set out from it by a nickel plated frame ; also the air pipes or cushions for relieving the strain on the pipes when the cocks are suddenly closed. All the pipes with their frames, supports, and fasteners are nickel plated. The brass pipes are frequently bent in long curves, like lead, and sharp turns with elbows avoided as much as possible. The piping is all put together with frequent unions, so that it can be easily taken apart. It was all fitted in position while unplated, then taken down and put back after being plated.

Over the range is a very large copper hood for arresting and removing the odors and hot air. As this would have hidden much of the piping if shown in the sketch, it is only indicated in dotted lines. The outline is not strictly correct; the width is considerably greater, projecting in front of the range a foot or two. It is hung from the iron floor beams overhead. The hot air and odors from cooking are carried off through an opening in one end of the hood into a rectangular duct surrounding the smoke pipe.

A plate warmer on the back of the range was left out entirely to avoid confusion in the sketch. Attached to that are several gas burners to light the range. The gas pipe comes up through the range into one of the rods supporting the shelves of the plate warmer, and thence along behind the turned-down front edge of the upper shelf, and is thus entirely hidden.

BOSTON PLUMBING LAW.

The Committee of Plumbers, appointed at a recent meeting of the sub-committee of the Boston Common Council on the subject, called a conference of the Master Plumbers of the city for Friday evening, at the City Hall, and nearly twenty responded. Mr. James Tucker was chosen chairman and Mr. William Mills secretary. The secretary read the ordinance which had been drawn up by the Committee of Plumbers to present to the Council, and those present were invited to make suggestions regarding the ordinance and the rules to be adopted under it. The proposed ordinance provides that all master plumbers doing business in the city be required to register their names, places of business, and residence in the office of the Inspector of Buildings. Licenses shall be issued to competent persons after an examination, the fee being $1.co. New work to be done must be defined, and the specifications filed with the Inspector of Buildings and Master Plumbers are to file monthly returns at his office. The plumbers shall report on all water waste. The ordinance was favorably received. After some discussion, Messrs. Isaac Riley, William Trainer, William Mills, Matthew Walsh, Daniel G. Finnerty, M. H. Hartnett, G. C. Loring, James Tucker, Daniel Buckley, and William Locke were appointed a committee to draw up a set of regulations to be presented to the city government.

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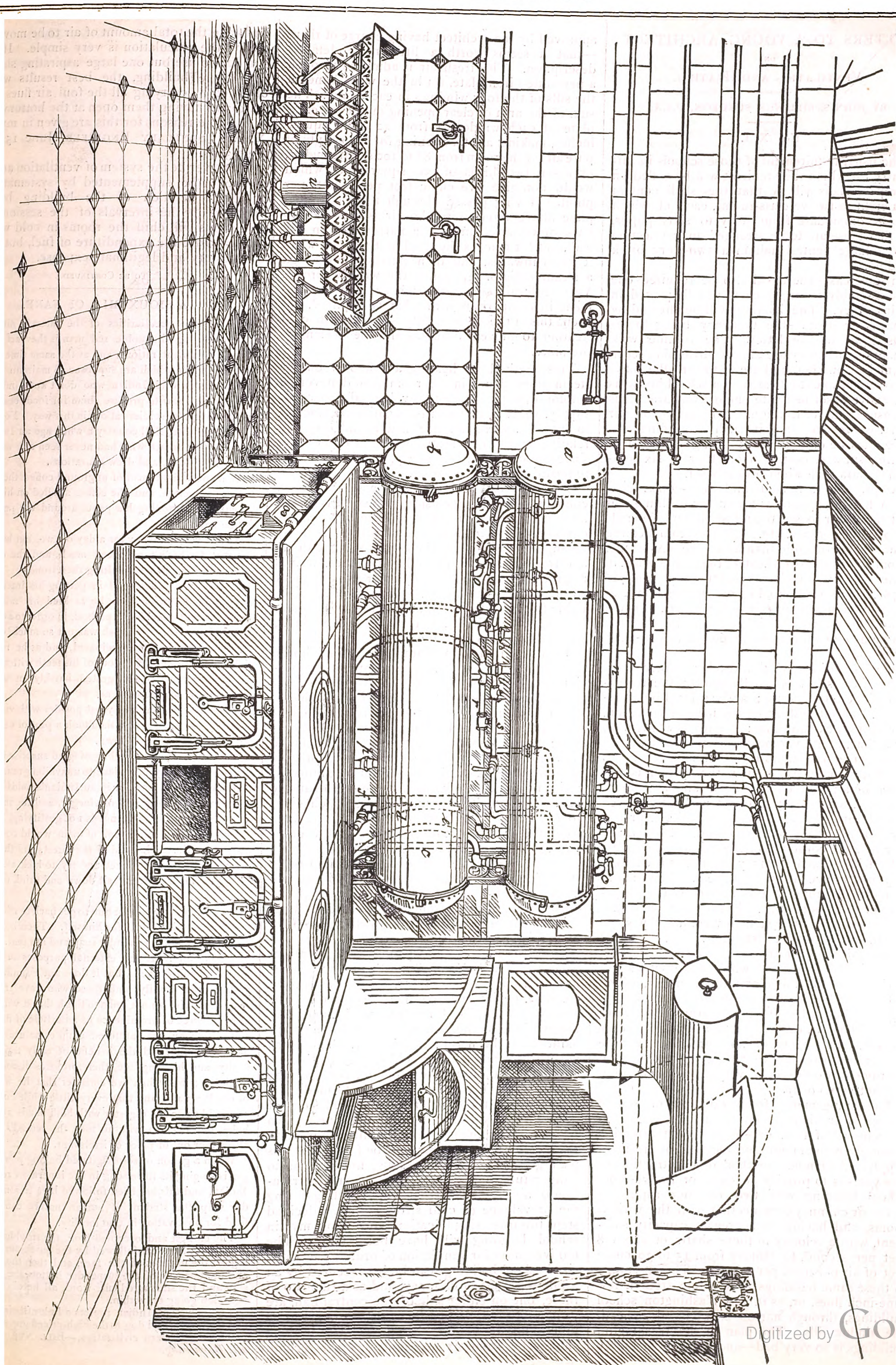

KITCHEN IN THE RESIDENCE OF MR. CORNELIUS VANDERBILT.

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LETTERS TO A YOUNG ARCHITECT

ON

VENTILATION AND HEATING.

BY JOHN S. BILLINGS, SURGEON, U.S.A.

No. XLI.

The usual requirement of those schools in this country for which the architect will be called in to prepare plans will be that they shall contain from eight to twelve class-rooms, each of which is to accommodate from forty to sixty pupils, and that these are to be arranged in connection with a large central hall in a two-story brick building.

In some cases there will also be required one large assembly room, which is usually placed in a third story. The heating will be effected by furnaces or steam—the tendency being to increased use of the latter. The trouble with furnaces is that they are almost invariably set in insufficient number, and are of too small a size.

To undertake to heat such a school house as that above described with one or two furnaces is to ensure bad ventilation. Not less than four furnaces are necessary in such a building, and these must be of the largest size, giving a large heating surface, costing from four to six hundred dollars each when properly set.

A properly arranged and well-constructed steam heating apparatus for such a building will cost from four to six thousand dollars, depending on the exposure, etc. Cheap steam heating is more objectionable than a furnace. As a rule, school rooms are over heated, the temperature in winter in our schools ranging usually from 72° to 76°. The rule should be that the temperature should never exceed 70°, and Dr. Lincoln is no doubt correct in his statement that children can be made comfortable at 66° in a well-aired room.

The sensations of the teacher rather than those of the scholars usually govern the regulation of the temperature; and, as Dr. Lincon remarks, "an interesting lesson may be going on, or a written examination; the mind works well, for a time, at a fever heat, and the temperature of 84° may pass unnoticed. It is needless to say that such a strain upon the system is followed by a period of lassitude; and a state of lassitude, again, may demand a slightly raised temperature. Thus, by degrees, habits of preference for hot rooms may be found. The teacher may be as unconscious of the evil as the scholar; indeed, if fatigued, she may require, or if excited, may not notice an unusual heat. The time to correct bad habits in this respect is the beginning of the school year. Everyone then comes to school with a system invigorated by some months of exposure to fresh air: and, if care is taken, this vigor or power of resisting cold may be retained." To this I would add, that a slight modification of the alarm thermometer, which arouses the keeper of a green house by the ringing of a bell, when the temperature falls below a certain point, can be easily applied to secure the constant ringing of an alarm whenever the temperature rises above 70°, and that such an instrument would be a very useful reminder, and not very costly.

The arangements for ventilation of school houses by architects relate, as a rule, mainly to the removal of foul air—no sufficient attention being given to amount and location of fresh air supply. A common method of construction of late years is to provide an eight or twelve-room school building with two or four aspirating shafts or chimneys, connecting with the various rooms, and having an aggregate capacity sufficient, with a velocity in these shafts of about 8 feet per second, to remove from 15 to 30 cubic feet of air per head per minute. The air supply in these same buildings is to come from a few nine-inch flues, or, as in the Washington school buildings, through narrow slits placed beneath the window-sills. The plan in the Washington buildings is so very bad—and yet was so highly approved by the architect having charge of them—that it seems worth a little more detailed description. The fresh air is admitted through a perforated iron plate, set in the walls beneath the sills of the four windows in each room. The sum of the area of clear opening in the external plate of each window is from 22 to 25 square inches, making a total opening for the supply of pure air for the room from 88 to 100 square inches, or about two-thirds of one square foot, which would not give five cubic feet per minute per pupil. Having passed through the perforated plate above referred to, the air is supposed to pass downwards through a narrow slit in the wall, until it reaches the level of the floor, when it turns inwards, and then passes up through a steam radiator set against the window breast. Very little air comes through such an arrangement in comparison with what is required, but even this little is carefully shut out in cold weather to prevent draughts and the freezing of the pipes.

This method of heating a school room by steam pipes placed in the room should never be employed, for it is sure to involve a defective air supply, yet it is one that is peculiarly attractive to those who are not qualified to judge of the relative merits of various methods of heating, since it is comparatively cheap, and does give the requisite amount of warmth.

The practical effect of such a system when connected with a large aspirating shaft is that a large part of the air supply in the class rooms comes from the central hall as will be seen by testing the direction of the currents at the doors and transoms. This central hall, in turn, derives a large part of its air supply from the basement by means of the stairways. This basement air is liable to be rendered impure by the furnace and by the water closets, if they are placed in it, which should never be the case.

First of all then in planning a school house consider the air supply. With regard to the location and direction of the openings in the school rooms for the admission of fresh air, they should either be situated above the heads of the occupants or be so placed as to give an upward current; for the amount of floor space which can be afforded to each pupil is so small that some of them must be placed in unpleasant proximity to registers located near the floor in the ordinary way. The usual location, and one which gives good results, if the fresh air flues and registers are large enough, is to place them on the outer walls, in which case the window sills are a convenient place for the registers. Mr. W. R. Briggs, of Bridgeport, Conn., proposes to introduce the fresh air on the inner wall at a point about two thirds of the distance from the floor to the ceiling, and has constructed the Bridgeport High School upon this principle.

His description of the plan will be found on page 4, of Vol. V. of THE SANITARY ENGINEER. In a letter from Mr. Briggs dated Nov. 13, 1882, he informs me that the building has now been occupied for several weeks, and that the working of the heating and ventilating apparatus has been very satisfactory. There has not yet been any weather cold enough to give the apparatus a thorough test, but on some of the coldest days (in which ice was formed) the temperature on the outer and exposed sides of the room was found to be from one to two degrees higher than on the walls directly beneath the incoming flues. Should it be found that this plan gives satisfactory results, not only as to temperature, but also as to amount and distribution of air supply throughout the building during the prevalence of cold strong winds, a decided step towards simplification and economy in school building will have been made. The motive power for ventilation of ordinary medium sized school buildings can be best secured by an aspirating shaft or chimney, and as a rule two of these, one on either side of the central hall, are to be preferred. The size of these shafts will be determined by the fact that the velocity in them should be from six to eight feet per second. Knowing the total amount of air to be moved per second the calculation is very simple. If it be decided to use but one large aspirating shaft for the whole building, the best results will be obtained by carrying all the foul air flues downward and having them open at the bottom of the shaft. The reasons for this are given in my letter XXXI. (SANITARY ENGINEER, June 15, 1882, page 329).

Whatever be the system of ventilation adopted it should be supplemented by systematic and thorough aeration of the building by open windows in the intervals of the sessions. No doubt this will chill the rooms in cold weather, and increase the expenditure of fuel, but this is a necessary and legitimate expense.

[TO BE CONTINUED.]

A SIOUX BILL OF FARE.

One of the peculiarities of the latest United States style of feeding the noble red man is the fact that he is given Government rations, and at the same time appropriations are made which are supposed to maintain him.

Sometimes a wild Indian who don't know much about groceries and how to prepare them for food, comes in and draws his regular soldier rations in this way. For instance, up in the Sitting Bull country a while ago an Indian came in from the warpath who had never seen any of the pale-face style of food, and drew his rations.

He made a light meal of unground coffee the first day, and as he overate, and the coffee swelled on him, he had difficulty in buttoning his pants around the pain that he had on hand.

He felt very unhappy for a day or two, but laid it to the fact that he hadn't exercised much, and the consequent *ennui* and indigestion resulting therefrom.

As soon as he succeeded in getting his interior department quieted down a little, he tackled his ration of candles. These he decided to parboil, in order to avoid trouble from indigestion. The dish was not so much of a glittering success as he had anticipated, and as he remorsefully picked the candle wicking out of his teeth with a tent pin he made some remark that grated harshly on the æsthetic ears of those who stood near.

He then tried a meal of yeast powder with vinegar. He ate the yeast powder and then took a pint of extremely potent vinegar to wash it down.

At first there was a feeling of glad surprise in his stomach, which rapidly gave place to unavailing remorse.

A can of yeast powder in an Indian's midst don't seem to be prepared for a pint of vinegar, and the result of such an unfortunate circumstance is not gratifying.

Every little while a look of pain would come over the features of the noble child of the forest, and then he would jump about seventeen feet and try to kick a cloud out of the sky. Then he would sit down and think over his past life.

It took about a week for him to get back to where he dared to get up another meal for himself. Then he fricasseed a couple of pounds of laundry soap and ate that.

Soap is all right for external purposes or for treating a pair of soiled socks, but it does not assimilate with the gastric juice readily, and those who have tried laundry soap as a relish do not seem to think that it will ever arrive at any degree of prominence as an article of diet.

That is why this untutored child of nature swore. He had never received the benefits of early training in profanity, and his language, therefore, was disconnected and rambling; but when we consider that he was ignorant of our language, and that every little while he had to stop and hold on to his digester with both hands and dig great holes in the earth with his toes, the remarks didn't seem altogether out of place or irrelevant.

When a gallon or so of agitated baking powder and vinegar is singing its little song in the innermost recesses of an Indian, and this has been followed by a treatment of laundry soap, the student of human nature can find a wide field for observation in that locality.

The earnest and occupied look, the troubled expression of the countenance, followed by the quick nervous twitching of the muscles of the face, and then the swelling up and the bursting of the suspender button, the deep-drawn sigh and the smothered cuss-word, all betoken the gastric agitation going on within.

This is why an Indian prefers a link of bologna sausage and a two-year-old dog to the high-priced groceries so common to our modern civilization.—BILL NYE, in the *Laramie Boomerang*.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Dec. 2, 1882	22.68	18.16	21.29	25.30	28.72	19.32

E. G. LOVE, Ph.D., *Gas Examiner.*

GAS AND THE ELECTRIC LIGHT.

The history of the past twelve months shows little change in the relative standing of the gas and the electric light companies in this city. Each industry can fairly claim to have held its own, and in certain directions to have made some progress. The constantly increasing value of gas stocks must have proved to any doubtful ones that the gas industry is not doomed to immediate extinction; and the fact that electric light companies continue to exist and even to multiply shows that, however small the present profits may be, there are a great many persons who are satisfied to place their money here, presumably in the hope of a rich reward hereafter. The recent action of the Edison Company in commencing the lighting of the down-town district is certainly encouraging—to the public, because it can now see and try this much-talked-of incandescent lamp; and to the holders of stock because there appears to be some immediate prospect of finding out just what return their investments will give. At the same time, the incandescent systems have yet to establish their claim to lighting on an equal footing with gas. That in certain places and under special circumstances the incandescent lamp will be found most useful, there can be no question; but it is from the general use of these lamps that success must come. It is now recognized that, if electricity is to replace gas for domestic lighting, it will be in the form of the incandescent lamp, and yet there are great possibilities in the future development of gas lighting which may reasonably be supposed to make the lamp but a poor competitor.

The arc systems of electric lighting never have, and probably never will, seriously interfere with the gas industry. So far as the public lighting of this city is concerned, the gas companies are not specially anxious to continue it, and naturally enough from their standpoint, for each 1,000 cubic feet of gas sold to the city for this purpose brings in about $1, while the same amount sold to a private consumer brings in $2.25.

The increasing number of arc lights in this city shows prosperity, and it is claimed that at present rates the companies are making some profit. We have no doubt, however, that the extent of these profits has discouraged many an investor who bought electric light stocks in the early days of the "excitement."

To the man who is called upon to pay a monthly gas-bill in New York, it must often be a matter of regret that the electric light in some form has not proved a more formidable competitor. Had such been the case we might naturally look for some reduction in the price of gas.

When the present Municipal Company commenced operations and promised gas at $1.50 per thousand feet, the unsuspecting public very naturally supposed that the time for cheap gas had come. This delusion was soon dispelled, for the inevitable "consolidation" came, and with it gas was found to be worth $2.25—at least this is what the public were asked to pay for it. Whether the electric light or some other cause is likely ever to effect a permanent reduction in price remains to be seen. At all events, it seems reasonably certain that the gas companies of their own free will never will make any reduction. The organization of new companies never gives permanent relief, but quite the contrary.

We certainly have no desire to rob the companies of what they might themselves consider a fair profit; but the profit at present prices is out of all proportion to the value of the commodity. It may reasonably be supposed that the public lamps in this city would not be lighted at a loss to the companies, and from their own estimate the gas is furnished at about $1.00 per thousand feet. To sell it then to private consumers at $1.50 would still give a handsome profit, even on the present enormous capital invested, and at the same time satisfy, or at least pacify the public.

It seems probable that New Yorkers are to be treated to another "new company" farce, as the daily press announce that a new company—the Equitable—has been formed under the leadership of the same gentleman who once before proposed to free the oppressed gas consumers of New York from the thraldom of "monopoly." Unfortunately, the Board of Aldermen some years ago were induced to pass an ordinance granting to any gas company which might be formed the right to tear up the streets of the city and lay gas mains—subject, however, to certain conditions to be named by the Gas Commission in each particular case.

When we remember the advent of the Municipal Company, and the statements made in its behalf by the promoter of this new enterprise, who, by the way, was the principal spokesman before the Gas Commission the other day, the conviction is forced upon us that it would have been in better taste if this enterprising individual had refrained from expressing solicitude for the gas consumers of this city and frankly stated that he was interested in a patent for an alleged new process, and that in order to be able to realize on it, it was deemed important that this new corporation should be allowed to tear up our streets once more, and it was also very desirable that more opportunities for the utilization of crude petroleum and naphtha should be afforded in order that those who have these products to sell may have a larger market.

This Equitable Company proposes to employ a new process, the success of which is by no means clear, and it asks the commission to state the conditions under which it may be allowed to experiment upon New Yorkers.

In return the company proposes to furnish gas to private consumers at $2 per thousand feet. It is quite needless to say that this reduction of twenty-five cents over present prices is no equivalent for the annoyance to which the public would be subjected by the company's operations. Granting that the enterprise is genuine, and that the company intend to construct works, and there comes in what is almost a certainty, that in the course of human events the new company will "consolidate" with the older ones, when after a period of lower prices, New Yorkers will have to pay exorbitant rates in order that dividends may be earned on the utterly excessive amount of capital invested in the gas business.

Meter-ites.

Coal gas escaping from the opened door of a stove killed two men at Harrisburgh, the 27th inst.

The Spring Garden Gas Works of Philadelphia, which have been long idle, were started up the 23rd inst.

A process has been patented in Germany for making explosive compounds by treating tar with nitric acid, and adding some oxidizing agent, as chlorate of potash.

Five or six miles of the eastern portion of the pipe line from the Bradford oil regions to the Delaware River at Philadelphia have now been laid. The Philadelphia *Bulletin* says that the whole line will be finished by spring.

The Metropolitan Gas Company of Chicago will erect new works at Hyde Park costing about $250,000. A franchise was granted them by the Trustees of Hyde Park in 1881, and they propose to furnish gas for both heating and lighting purposes.

A draft of plans for the new works of the Consumers' Gas Company of Chicago, has been submitted to the Commissioner. Six buildings, estimated to cost $100,000, will be erected by next summer. The plans are a duplicate of those of the Equitable Gas Works of Baltimore; W. H. White is the engineer.

A report was adopted in the special Committee of Councils of Philadelphia Dec. 1, providing for the sale of the gas works. The Treasurer must furnish gas for not more than $1.50 per 1,000 feet, the city to be allowed a discount of 10 per cent. on gas supplied to public lamps. No bid less than $10,000,000 will be considered.

Utica has entered into a contract with the Oneida Street Lights Company of that city, to light certain lamps at a cost of $23.75 per lamp per year, if the contract run for three years, or for $23 per year if run for five years; the lamps to be lighted 27 nights in each month, to burn on an average ten hours per night.

The City Attorney of Rochester has expressed the opinion to the Mayor that the city has the right to substitute gas lamps by electric lamps, in view of a provision in the contract with the gas companies, reserving the right to substitute electric light in the place of any gas lamp, and the city would not be liable to the gas companies.

A gas explosion occurred in a business house in Rochester the 26th ult., caused by the gas escaping from a broken fixture. The gas had been escaping from the fixture which was in the basement, unnoticed for a considerable time. When afterward an attempt was made to light gas at this fixture an explosion occurred, which threw cases of goods about, but did not seriously damage the building.

A passenger car of the New York, Lake Erie and Western Railroad recently arrived in Chicago burning the Pintsch system of lighting. The Chief Engineer of the Pintsch Company, who was in charge of the car, told a reporter of the Chicago *Times* that the gas cost in Jersey City $1.55 to $1.75 per 1,000 feet. The cost of the burners and tanks is $265 to $300 per car. The light was produced at the rate of 1¾ cents per hour.

Mr. C. W. Siemens, in his opening address at a recent meeting of the Society of Arts, reviewed several interesting questions relative to illumination by gas and electricity. Among other things he said: "I do not, however, agree with those who expect that gas lighting will be entirely suspended, but have on the contrary, always maintained that the electric light, which possessing great and peculiar advantages for lighting our principal rooms, halls, warehouses, etc., owing to its brilliancy, and more particularly to its non-interference with the healthful condition of the atmosphere, will leave ample room for the development of the former, which is susceptible of great improvement, and is likely to hold its own for the ordinary lighting up of our streets and dwellings."

ELECTRIC LIGHT NOTES.

The directors of the Mercantile Library of Philadelphia have had electric lights placed in the newspaper rooms.

The Canterbury Cathedral is to be illuminated for three months by lamps supplied by the South-Eastern Brush Electric Lighting Company.

The winter electric exhibition at the Westminster Aquarium, will open about Christmas. It is stated that the prospects are now good for success.

Engineering states that most of the factories at Gand are now lighted with electric lamps. The spinning mills of La Lys, where several thousand workmen are employed, are to be so lighted throughout.

The London *Times* states that Mr. Jablochkoff has invented a new electrical machine, which can be used either for converting motive power into electricity or as an electro-dynamic machine converting electricity into motive power.

A conduit for electric wires, recently patented in this country and England, is made of pottery clay, the sections laid end to end, and secured by Portland cement. Each section consists of an upper and lower half, the latter having compartments for the wires. Elbow lids are introduced at intervals for capping the wires.

The art department of the Industrial Exhibition at Charleston, S. C., was illuminated by 42 incandescent lamps hung about the four sides of the space devoted to the art exhibits, and 12 lamps attached to a chandelier in the centre. The lights attracted much attention, and were considered one of the most interesting features of the exhibition.

Hartford, Conn., having asked several electric light companies to submit estimates of the cost of street lighting, has received several replies. The Excelsior Electric Light Company of this city, thought it could furnish light at 80 cents per lamp per night. Several other companies asked for more definite information before making estimates, and no replies were received from the Edison and Brush Companies. The Hartford Company were not prepared to make any estimate. The Street Board will have a hearing on the matter at an early day.

AN EXPLANATION.

THE DURHAM HOUSE DRAINAGE COMPANY,
No. 187 BROADWAY, NEW YORK, *Dec.* 5, 1882.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR:—In reference to a criticism passed upon one of the illustrations in the pamphlet published by the Company, in your issue of Nov. 30, I beg to state that your assumption that it was a draughtsman's error is correct. We are glad to have our attention called to the matter, and will have the block corrected.

Very truly yours, C. W. DURHAM, *President.*

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SANITARY OPINIONS FROM PODUNK.

The following letter published in the Philadelphia *Medical Times* of July 5, 1873, is good enough to reproduce here. If the writer is still in existence THE SANITARY ENGINEER would be glad to hear from him.

Dear Tim :—

You will be glad to hear that I am now Health Officer and President of the Board of Health of this metropolis; and I find that your advice to go in for hygiene as a promising lead was sound, as it generally is. I made my first move in the department of ventilation—got up a new system by putting the openings at the middle, instead of top or bottom; and my new American Universal Ventilator is a success—can be applied to anything, from a hat to a hospital, and is now being introduced by order of the Board of Health into every chimney and hack in town. I get three dollars royalty on each one; how high is that? I am now getting up a hygienic cooking stove with disinfecting attachment, and I don't think there is less than five thousand dollars in it. But to come to the point I am going to start a daily hygienic journal, *The Podunk Sanitorial Cosmopolitonian*, to be printed on medicated paper and of suitable size. I want you to write some articles for it, urging from the legal point of view, the necessity for legislation on the subject, and for a Central Bureau of Hygiene; and I want you to write, or get some one to write, an article on the climate of this part of the country as good for cancer and baldness.

The climate changes pretty often and pretty fast—is hot and foggy and damp and raw, and couldn't be recommended for consumption no way. But there are no cases of cancer here, for the last one died about two weeks ago; and the druggist told me he had three pounds of cundurango left, and no customers; and did I think it might be good for anything else—such as granular lids, or biles, for instance? Well—don't you see? The climate here must be good for cancers, and you can say as much as you like as to its effect on the baldness. What I propose to do for the science of hygiene is to make it practical, you know,—bring it before the public in such a way that none will know it but to love it, so to speak. The demand of the age is for statistics, and I am going to have some. Take corns for instance. The average is 1,3007 to each individual. But what a corn doctor wants to know, and what the spirit of the age demands, is precise data as to the influence of locality, climate, diet, and ventilation upon their growth and development. And the *Cosmopolitonian* will have those data, for I am going to make them.

I shall advocate Congressional legislation of course; and that's where I want your assistance. What I favor is a corps of United States sanitary inspectors—say one for each State and territory, and a dozen for Europe and Asia. Have a handsome series of blanks prepared, including all possible questions, and let the inspectors report once a month. I suppose there would have to be some sort of a head centre for them to report to; though there are some objections to it. Depend upon it, that is the system that is going to be established, and you can't do better than put yourself in training for one of the inspectorships by writing some sanitary articles for me. Of course, we must organize and keep out the quacks, who are intruding everywhere; there's one on the Board of Health here, who got the place on the strength of a sanitary tooth brush with a hollow handle to be filled with hygienic powder, which passes out between the bristles, on the principle of Mason's potato drill. I'd like to put one of my ventilators into the side of his head.

By the way, I could get the office of chemist to the board created, and hold it myself, if you can find me a good, competent man for assistant, who will run the department and not blow about it.

To return to the organizing. The National Health Association have got the start of us, but they have taken in a number of people who don't care about office—in fact, who have got good places now, and therefore will criticise and object to all moves which will be of any "practical use" to the organizers. If I hadn't thrown away time and opportunities I might now perhaps, be in Washington in a comfortable office as chief of the National American Republican Sanitary and Hygienic Enforcement and Vitally Statistical Bureau, and if I was, I can tell you that the N. A. R. S. H. E. V. S. Bureau would be an institution worth caring for. But the bloom has been brushed from that *idea*, and we will go in on a bigger platform.

Yours as usual, D. D. DOUCEIT.

Correspondence.

MALARIA AND ONIONS.

NEW YORK, *Nov.* 13, 1882.

To the Editor of THE SANITARY ENGINEER:

I concur with you in your objections to Dr. F. H. Hamilton's article on "Sewer Gas" in the *Popular Science Monthly*.

If his views on sewer gas were accepted in their full length and breadth they would be so alarming that we might expect to see 50 per cent. of the population of New York city die every year from that cause alone.

But, fortunately nature has provided a safety valve—in short, it is proved by my experience and that of many others that persons can live with impunity though surrounded by an air full of malaria, sewer gas, vile smells of all sorts, etc., and yet grow fat and hearty, provided they will partake of certain articles of diet of an antiseptic nature, the chief of which are garlic and onions. Another is lemon juice, a third is seltzer water or bicarbonate of soda in water; and there may be many others. The garlic and onions acting through the salicylic acid that they contain.

Look at the Jews in London. They live in the dirtiest quarter of that city, yet they laugh and grow fat with their diet, of which onions form a large share.

Look at the Italians of New York city, who live on a piece of bread and garlic and get stout and strong on them, outworking the native Americans.

Remember the New Jersey farmers, who two years ago, cured their horses and themselves of the great epizoötic with common New Jersey wild onion. See Rufus Hatch, the great Wall street banker, who in the newspapers has recommended everybody to use Bermuda onions, saying their constant use would bankrupt the undertakers and close up half the doctors' offices.

What is the explanation of this? Simply this: The mode of operation of malaria, sewer gas, and bad smells generally, is to cause a weakness of the kidneys in a person thus affected; they do not carry off all the uric acid produced in the blood every 24 hours. There is constantly an accumulation of this dangerous uric acid in the blood, the first effect of which is neuralgia or rheumatism; the next and more terrible effect, is fermentation of the blood, which thereby becomes coagulated and septic. This in its turn produces diphtheria, pneumonia, typhoid fever, smallpox and other zymotic diseases.

Rid the blood of this surplus of uric acid and you cure these diseases. Garlic and onions will do this, particularly if assisted by bicarbonate of soda and lemon juice, and a cathartic like aloes or castor oil to carry off that part of the blood which has already become foul or rotten, in the shape of mucous matter discharged through the bowels.

This being established and proved, by my own personal experience, and easy to test by any person, it follows that if a person will daily partake of garlic or onions they will have a perfect immunity from the effects of sewer gas, malaria, etc., and can very safely defy them, a fact that Dr. Hamilton should have known long ago. But here comes in this most unfortunate prejudice that our American people have against these healthy articles of diet, and this it is that is making us a nation of weak, nervous people. Our climate is much more malarious than that of Europe. Every time that that former big swamp, our Western prairies, is ploughed in spring and fall, the air becomes overloaded with malaria, which the prevailing west winds waft here and which we breathe, and yet we neglect our only means that are universally and cheaply applicable to counteract this morbid condition of the air, viz.: a diet containing garlic and onions. But we pay dearly for it in the torments of neuralgia, which causes so much suffering every fall to our ladies, and in the increase of insanity, in the various zymotic diseases, and the deaths they cause, in the immense consumption of whiskey and other stimulants and in drunkenness. A healthy person using garlic and onions will not feel the need of liquor to stimulate him. The garlic and onions will stimulate him just as much as whiskey without its bad effects. This is probably a new theory to you, Mr. Editor, but all I ask you is to go ahead and prove it by your own experience, and then to go ahead and do all the good you can in God's name by helping others through it. Yours respectfully,

A CHRISTIAN.

P. S.—Ask any horse jockey what he means by the expression "to garlic a horse," and what the effect of garlic is on a horse in making him look young again.

[Such a simple universal panacea as our correspondent proposes has long been sought for, and a number of people believe that they have found it. The majority of these people at present are cared for in institutions specially provided by the State for that purpose, and are happy in their faith, which we have no desire to disturb.

During the middle ages the onion was considered to be a preservative against the plague, and was known as the "Theriac of the poor." Applied to the stomach of infants it was supposed to kill worms. Diphtheria, pneumonia and typhoid flourish where there are no sewers and no malaria. And our friends in Arizona and New Mexico, who are familiar with the sight (and smell) of a Mexican, reeking with onion and garlic, and shivering with ague at the same time, will have their doubts as to the theory above propounded.]

ATTEMPT TO SCAMP.

NEW YORK, *Nov.* 14, 1882.

To the Editor of THE SANITARY ENGINEER:

Where a contract calls for extra heavy iron soil pipe, is the plumber justified in supplying *selected* pipe of ordinary weight? This was done in a certain case by a reputable plumber. ARCHITECT.

[Not by any means. We should consider it an attempt to scamp. We have repeatedly suggested that architects should specify the weight per foot of pipe which is given in the catalogues of reputable manufacturers, who, by the way, should cast the average weight on each length.]

THE SYPHONAGE OF TRAPS.

SAN FRANCISCO, CAL., *Nov.* 15, 1882.

To the Editor of THE SANITARY ENGINEER:

It is with sorrow that, in the interest of right, I must differ with such an authority on sanitary matters as Col. George E. Waring, Jr., who, in his published report on the Syphonage of Traps, has again proved an old saying amongst us Californians, viz., that "no one man knows it all." While we are willing to admit his ability as an engineer in large works, I think the matter in question was a subject with which he did not have any previous experience, and therefore in justice his deductions should only be entitled to the same consideration that would be shown to the amateur sanitary engineer who should attempt to upset and declare unnecessary all the rules laid down as requisite by the best drainage engineers of the world. As a plumber with a quarter of a century's experience, I hold that the experimenting apparatus used was not a fair sample of the plumbing work as found in an ordinary dwelling, and therefore the deductions made should not be given to the public as such. If the report was headed, "How to Build Safe Plumbing with Only One Vent Pipe" (and make your house conform to it), and ended with the original proviso that, under no circumstances should the branch waste pipes from bath or basins be longer than seven feet from the soil pipe, the public would not be deceived; but the fact that the report has been published in the *American Architect* makes me fear that the patrons of that journal all over the country will be inclined to cease all study in the matter of preparing specifications for plumbing work, and fall back again into the old method of having it done as cheap as possible, without regard as to its safety, from a sanitary point of view.

My objections to the report are:

First—The experiments only covered the work on one story. Had the experiments included the work of two or more stories, the results would have shown a different state of affairs, and even with the soil pipe open on top, all the traps on the lower floor would be found to have lost their seal.

Second—The glass traps used in the experiments contained a water seal of from 3 to 5 inches, while the traps in actual use have only a seal of from 1¼ to 1½ inches, and the liability to syphonage in the trap with the light seal is far greater than in such a trap as used by Colonel Waring.

Third—I believe that Mr. Waring himself has said as many hard things about the common pan closet as anybody, and I am surprised that he should have chosen it to use in the experiments. Had the tests been made with any of our modern water retaining closets, even though they only extended over the work of a single story, I think the report would never have been published, and I hold that the receiver of a pan closet and the air space in that portion of the trap from the floor to the water line, as shown at Fig. 4, was a far different thing for the water from the bowl to fall into, than in the case with the water from the bowl of one of our modern closets, for in the case of the closet tested, the water could only fill one-fourth of the space, while in the case of the modern closet the whole space would be filled, and the difference is as between a pipe partially filled and one filled solid.

Hoping that those who are better able to show the fallacy of such a report will not miss the occasion, I remain

Yours respectfully, JOHN J. DIXON.

[In the *American Architect* of November 25, Col. Waring, in alluding to his experiments, states, "in one sense they are of little value, for the experiments of others show that under other conditions the open top of the soil pipe may fail to protect the trap."]

FOOT VENTILATION.

To the Editor of THE SANITARY ENGINEER:

The sketch I enclose is of an English villa with soil pipes outside the house. Is there any objection to placing a ventilating chamber and grate where shown? There is at present no means of ventilation between the soil pipe and the sewer. Should the ventilating grate be between

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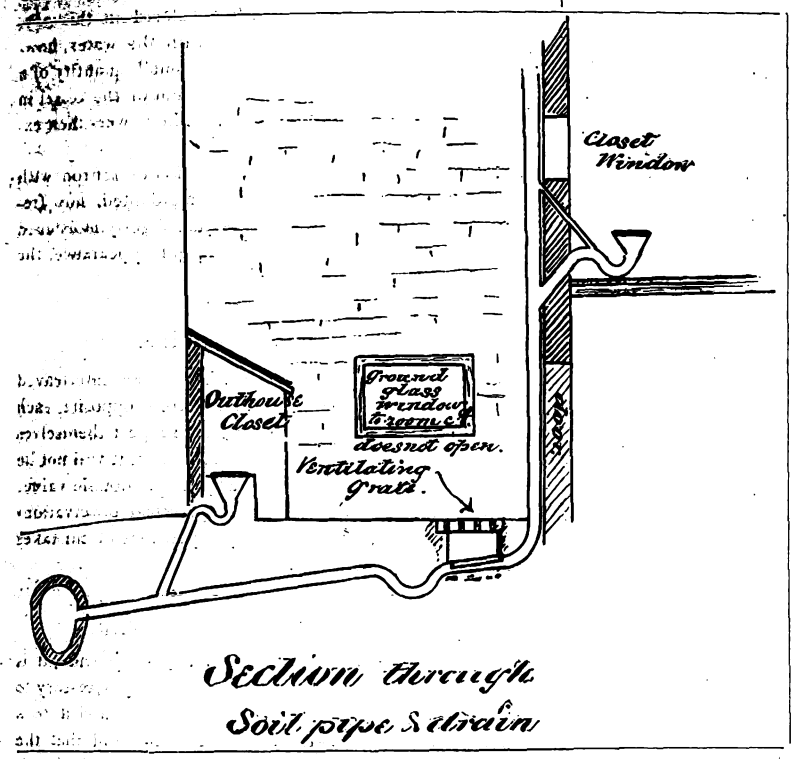
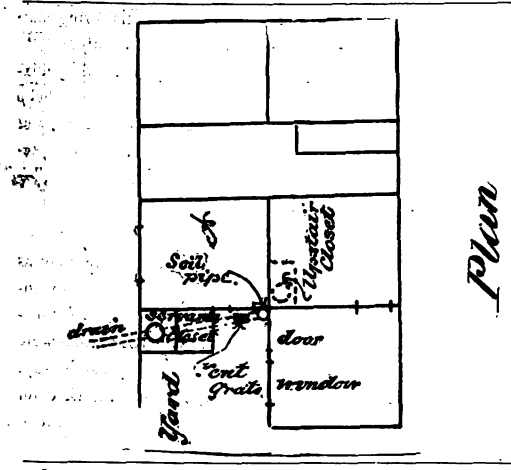
the servants closet and the sewer? If so, will that be sufficient to create a current of fresh air through the soil pipe? Generally, is the ventilating chamber trapped on the sewer



side, to be avoided when within a few feet of a door or window and be placed at a greater distance from the bottom of the soil pipe? By answering these questions you will oblige, R. H. T.

NEW YORK, *Nov.* 2, 1882.



[The fresh air inlet as shown in the sketch would provide only for the circulation of air through the vertical soil pipe. If the main trap was located beyond where the branch from the outhouse closet joins the house drain, and set in a vault with the fresh air inlet opening in this vault, with grating over it, you would remove the dead end that exists between outhouse closet and the main trap, located as shown in your sketch; otherwise we see no objection to locating fresh air inlet as you propose.]

RADIATORS WITH ONE VALVE.

To the Editor of THE SANITARY ENGINEER:

In your editorial note, page 367, referring to my diagram of heating apparatus, you are entirely wrong. Steam can be regulated as easily as gas or a stream of water by partially closing the valve as much as needed. I hope you will see this and will rectify it for your readers' benefit. I am yours faithfully, F. BOTTING.

[The editorial note mentioned appeared at the bottom of page 367, sixth volume, and is a comment on a letter of Mr. Botting's (same page) which refers to the "Thermus" article of July 20. The article goes to show there is *one* condition with a gravity system of piping under which the *temperature of the surface of the radiator may be lessened by reducing the pressure and consequently quantity of the steam as it enters through the radiator valve* (the pressure in the boiler remaining unchanged), and at the same time allow the water which forms within the heater by condensation to run out of the radiator at the opposite end (or through another pipe connected any place to the base and sufficiently low down) and not choke it with water.

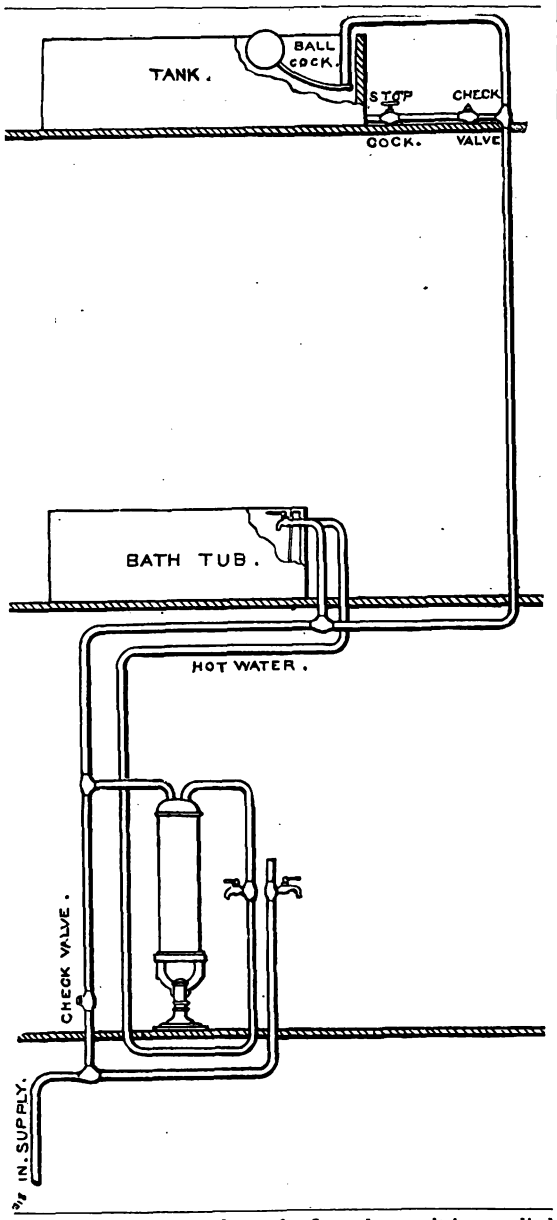
Mr. Botting's letter began by quoting from the "Thermus" article, saying, "The fewer the parts there are to a steam apparatus, and the simpler they are, the better," and then it goes on to describe and illustrate the *one pipe system* (see Fig, 1, page 2, Baldwin's "Steam Heating for Buildings"), so much in use in this country some 12 to 15 years ago for private houses, and sometimes known among steam fitters as the "Gold system," because the Gold sheet iron heaters were always connected this way.

At the time we inferred that Mr. Botting thought he was bringing to our notice a system new to us, but we refrained from saying more than simply pointing out the most serious objection to the *single pipe* and *single valve system*, namely, that if the valve leaks, or is carelessly closed, the heater will fill with water; and that the valve must be either open wide or closed tightly; no graduations being admissable. If steam is passed to an engine or pump, or for any purpose where the passing of the steam only is the object, it can be regulated to a certain extent by "*throttling*," but when all the steam which passes such a contracted vein, with a comparatively high pressure at one side, forcing its way in the direction of the reduced side, where it is to be condensed, *it cannot, after it has been formed into water, be made to pass back again through said contracted opening in a contrary direction to the jet of steam entering the heater.* The question is not the regulation of steam. It is the reduction of the temperature and quantity of steam admitted to a radiator, when that radiator has but one connection.]

HORIZONTAL CHECK VALVE.

To the Editor of THE SANITARY ENGINEER:

I enclose a drawing of a job of plumbing I did. The bath room is on the fourth floor, where the water don't rise at



all times. I put a tank on the floor above; it is supplied through a 5/8-inch pipe with two check valves. Will you be kind enough to inform me what prevents the water from rising through the pipe from the tank. The pipe is clear of all obstructions; I can blow through it easily.

Respectfully, JOHN NEWELL.

[The trouble seems to be in the horizontal check valve, which we infer is one of the spindle pattern, the spindle passing through a bridge or guide; they are not suitable in such a situation, as they are liable to stick to their seat. We suggest that you use the hinged valve, which is made Y-shaped, or possibly the old style leather clapper valve will be better. The former can be put on a horizontal pipe; the latter only on a vertical one.]

STEAM PIPES AND DISEASE GERMS.

MONTCLAIR, N. J., *Nov.* 18, 1882.

To the Editor of THE SANITARY ENGINEER:

What is to be the effect on the health of the city by the piping of our streets with steam pipes maintained at a high temperature by the steam power companies? If the organic matter, everywhere present, is to be nursed into life by the heat beneath it, the disease emanating from germ life might become a terrible menace with an incubator of such magnitude to favor its growth.

Respectfully, SAM'L CRUMP.

[The steam pipes are so insulated as to give out very little heat; were it otherwise the business would not pay. They are for the most part laid at such a depth that the amount of soil above them would be a sufficient filter for all germs developed in their immediate vicinity. Were they laid in ground filled with street sweepings, etc., there might be for a time some development of gases, but the supply of material would soon be exhausted. The question is a suggestive one, and observations made upon the soil in the vicinity of some of these pipes would be of interest.]

SANITARY READING.

HIGH SCHOOL, NEWARK, N. J., *Nov.* 16, 1882.

To the Editor of THE SANITARY ENGINEER:

Can you assist me, by referring to methods, or authorities, in the preparation of an article on "Hygiene of our public schools," for the Newark Teachers' Institute? I desire information on the analyzing of air, especially. Any help you can give through your columns, or otherwise, will be publicly acknowledged and duly appreciated by, Yours respectfully, G. C. S., *Instructor.*

[Consult:

Robson, E. R., "School Architecture," 8vo. London, 1877.

Lincoln, O. F., "School Hygiene," in vol. 2. Buck's Hygiene, N. Y., 1879.

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Chittenden, T. W. "Our School Houses." Fourth Annual Report State Board of Health, Wisconsin. 1879, p. 123.

Kedzie, R. C. "School Building." Report State Board of Health, Michigan, 1873, p. 65.

School House Competition. SANITARY ENGINEER, N. Y., vol. 3, p. 125.

Martin, A. C. "The Ventilation of School Houses." Report State Board of Health, Mass. 1871; vol. 2, p. 370.

Also, American Architect, Boston, 1877, vol. 2, p. 416.

Briggs, W. R. "The Hygienic Construction of the Bridgeport High School," 8 vo., Bridgeport, 1881.

Report on School buildings in the District of Columbia. Doc. 35. House of Representatives. 47th Congress, 1st session. Washington, 1882. Congrès International de l' Enseignement. Bruxelles, 1880, 8vo. (for papers by De Chaumont, Dekeyser, Wazon, Norjon and Javal).

Circular No. 2. Bureau of Education, Washington, D. C., 1882, contains papers by Drs. Billings and Smart, U. S. A., on Methods of Examining Ventilation of a School Building, and on Air Analysis.

In his introduction to "Eighteenth Century Essays" Mr. Dobson writes the following stanzas:

With slower pen men used to write,
Of old, when "letters" were "polite;"
In Anna's or in George's days,
They could afford to turn a phrase,
Or trim a straggling theme aright.

They knew not steam; electric light
Not yet had dazed their calmer sight;
They meted out both blame and praise
With slower pen.

More swiftly now the hours take flight;
What's read at morn is dead at night;
Scant space have we at art's delays,
Whose breathless thought so briefly stays
We may not work—and would we might—
With slower pen.

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Food and Drugs.

INSTRUCTIONS TO STATE ANALYSTS.

The State Board of Health, Lunacy and Charity of Massachusetts have issued instructions for the government of the analysts charged with the examination of articles under the adulteration law which was recently passed in that State. After defining what constitutes adulteration in accord substantially with the law of this State, the regulations continue:

TO PROCURE SAMPLES.

Third.—The analysts shall procure in the manner provided by the Act or in any legal and proper manner and with reasonable diligence, drugs and articles of food included in the provisions of this act for the purpose of examination and analysis and shall report to the board the results thereof together with such suggestion as they may deem necessary to the efficient enforcement of the law.

Fourth.—They shall also report to the board from time to time such articles, mixtures or compounds as, in their judgment, should be declared exempt from the provisions of the act, and they shall present to the board lists of such articles or preparations for publication by the board if the latter deems proper.

Fifth.—Should the result obtained by either analyst be questioned, the other analyst shall repeat the analysis, unless otherwise instructed by the board, provided a sufficient sum to meet the expense of analysis be deposited with the health officer by any interested party feeling aggrieved, which sum will not be returned unless the second analysis fails to confirm the first in essential particulars.

Sixth.—Any appeal from the decision of an analyst shall be filed with the health officer, who shall report it, and any matter in controversy to the board, giving his judgment thereon, and the board shall supervise and control the action of its officers in executing this act.

STANDARDS OF QUALITY.

Seventh.—Where standards of strength, quality or purity are not fixed by the Act, the analysts shall present to the health officer such standard as in their judgment should be fixed, and the health officer shall report the same to the board for its action. The standards set by the British Society of Public Analysts will be followed as nearly as practicable until otherwise ordered.

Eighth.—Whenever a drug or preparation not described in a National Pharmacopœia or other standard works on *materia medica* shall be manufactured, offered for sale, or used in this State, the standard of such drug, and the standard and proportions of the ingredients of such preparation and the range of variability from such standard or standards shall be ascertained of the analysts, who shall report the same through the health officer to the board

Ninth.—Each analyst shall procure all necessary and proper samples of drugs or articles of food for analysis by tendering to the party manufacturing for sale, exposing for sale, offering on sale, or delivering on sale the value of a necessary and proper sample in each instance, and each analyst shall arrange his samples for analysis as he may deem convenient and expedient.

Tenth.—Lists of these articles, mixtures or compounds declared to be exempt shall be published and a copy sent to each Board of Health, each correspondent of the Health Department, and to such publications as may from time to time be determined.—*Com. Bulletin, Boston.*

SOLUTION FOR DETERMINING THE HARDNESS OF WATER.

The *Chemist and Druggist* mentions a new method of making a volumetric solution for determining the hardness of water, suggested by Mr. C. R. C. Tichborne, in a paper read at a meeting of the British Pharmaceutical Conference.

The writer proposes to prepare a definite oliate of soda in place of the soap solution now employed. Oleic acid forms both a monobasic and a dibasic salt. Either will answer for the purpose.

The following is the process:

Five c. c. of oleic acid are measured with a pipette and 50 c. c. spirit added to it in a beaker; two drops of phenolphthalein solution are also added, and immediately a volumetric solution of soda is run in until a pink indication is produced. This indicates that the point of neutrality has just been passed. The result is a solution of the monobasic salt. A drop more of the volumetric solution of soda develops the pink to a magenta, but, as the process goes on the solution again becomes decolorized, indicating the formation of the dibasic salt. When half the second equivalent of soda has been added the solution begins to pectise, and when the process is complete the solution becomes a solid jelly. Whichever solution is made (the author prefers the latter, as it lathers more freely and is more permanent), the oleate of soda is then made up to the required measure by the addition of a mixture of equal parts of rectified spirit and distilled water.

The advantages claimed are that the soap solution may be made in five minutes, requires no titration against a standard water, and is more permanent than those made from ordinary soaps.

WHAT IS PURE MILK?

The English Local Government Board is puzzled to know how to define "pure milk." At present it seems impossible to discrimate between the milk of a poorly-fed and poorly-kept cow, and that of the very best milk which has been adulterated with water. Chemical analysis simply shows the amount of water, fat, etc., but cannot tell whether the water has been added or whether the milk was naturally dilute.

It is but reasonable to demand that so important an article of diet as milk should not be offered for sale if it comes from an animal not properly cared for. This would dispose of cases which would naturally arise.

If any standard were adopted it would of necessity have to be based upon the relative proportions of the different constituents of milk supplied by a well-kept cow, and that no injustice might be done the poorest sample of milk so furnished would constitute the standard.

The average of a large number of samples would form the best standard, but in certain cases milk would be found below such a standard, and yet be furnished by a well-kept cow.

Fortunately, the milk supply of our large cities is composed of a mixture of the milk of a number of animals, and an average is thus more nearly obtained.

ARTIFICIAL QUININE.

A few months since the scientific world was surprised by the announcement that the French chemist, E. J. Maumené, had discovered an exceedingly simple synthesis of quinine, based on the use of a compound (NH_2) never yet produced. It was then stated that all that remained was to compare the therapeutic effects of the natural and the artificial alkaloids. It was considered strange that Maumené should be the man to discover the process, inasmuch as his previous investigations had been in other directions. It has also seemed strange that the patient and protracted labors of many German chemists, who have worked for years upon this problem, had resulted in nothing tangible. Maumené had, however, a reputation for good work in other directions, and, in consequence, his plea for more time was considered proper, and chemists waited patiently for the details of the process which was to make the cultivation of the cinchonas no longer a necessity. But, as time elapsed, doubts were expressed, and soon other chemists began to experiment. Maumené had described the production of NH_2 by the action of potassium permanganate upon ammonium oxalate, and had produced a carbonate of the new base.

M. Combes* has gone over the same ground, and proves that "the only products of the reaction are ammonia and carbolic acid." He changed the ammonia carbonate into chloride, and then obtained conclusive analytical evidence in support of his statements.

We understand that the whole question has been submitted to the eminent chemist, Wurtz, from whom an impartial and authoritative statement of facts may be expected.

At present it seems exceedingly improbable that Maumené's results and statements will be confirmed.

ADULTERATION OF SAFFRON.†

The blossoms of marigold (*calendula*), dyed red, have often been used for the adulteration of saffron, which sophistication admits of ready detection by throwing a small portion of the suspected drug into water, whereby the flowers unroll, and can be respectively recognized.

To avoid this easy detection, the fraudulent dealers now employ a mordant which renders the false color impervious to water; for Dr. C. Grote, apothecary in Brunswick, has met with *Flores calendulæ* colored in this way. By mixing some caustic ammonia with the water, however, the mordant gives way, and a small quantity of a mucilaginous mass is found at the bottom of the vessel in which the flowers have been tested. The flowers then expand as usual.

Dr. Grote states that the adulteration of saffron with marigold flowers, thus colored and mordanted, now frequently occurs, and as the whole is just slightly moistened with glycerine, so as to give it a bright appearance, the adulteration is not at first detected.

*Compt. rend. 94, 1,717.

† *Chemist and Druggist, from Pharm. Centralhalle, Aug.* 3, 1882.

INTERLEAVED COPIES.

If every working pharmacist will buy an interleaved copy of the Pharmacopœia, and record opposite each preparation, whatever practical points suggest themselves upon trial of the various processes and tests, it will not be long before the book will have acquired a double value. It is surprising how often these practical observations will come into use, and how many repetitions of mistakes once made may be avoided.

JAM FROM TURNIPS AND TAR.

According to the correspondent of a trade journal, it is a mistake to suppose that fruit is absolutely necessary to the manufacture of preserves. He describes a visit to a large jam-producing factory, in which he found that the work was being bravely carried on without the aid of fruit at all. Jams of various kinds were being produced before his eyes—currant, plum, strawberry, apricot, raspberry and gooseberry. Yet neither currant, plum, strawberry, apricot, raspberry nor gooseberry was in the building. Turnips served the purposes of the fruit. The flavoring matter was extracted from coal-tar and the resemblance to raspberry and strawberry jam was further produced by mixing the boiling compound with small seeds of some cheap innocuous herb. A common form of sugar is used, and this is the only honest ingredient of the mess. These preserves are offered as made from "this season's fruit."—*London Times.*

Wooden hams and nutmegs have not been unheard of as articles of trade, but wooden cloves seem to be a new invention. An East India paper publishes as a fact, that several bags of cloves received in London from Zanzibar were mixed with artificial cloves made from wood by machinery. The cloves were made of soft deal, stained a dark color and soaked in a solution of essence of cloves to scent them. —*Analyst, Nov.*, 1882, p. 208.

THE BOSTON CATTLE QUARANTINE. STATION.

Fifty thousand dollars was appropriated by the last Congress for the establishment of cattle quarantine stations at the ports of Baltimore, Philadelphia, New York, Boston and Portland. The site for that of Boston has lately been selected, and is described in a recent issue of the Boston *Transcript.* It is located in Waltham (twelve miles from the city) a mile from the centre of the town, between the Charles River and the Fitchburg railroad track. It comprises thirty-five acres with a chance of increasing the area if desired. A large yard will be enclosed and several sheds erected, 40 x 80 feet, giving accommodation for forty cattle each. Cattle from foreign ports will be brought here at once, on arrival, and retained ninety days to determine whether they have contagious diseases.

Unprecedented improvements have taken place in Vienna during the past twenty years. Nearly $40,000,000 have been spent on the city water works, school buildings, new town hall, main drainage, widening and paving of streets, and other useful and ornamental works, including the Danube embankment.

By an order adopted November 22, the Boston Board of Health forbade public funerals over the remains of persons who have died of small-pox, scarlet fever, diphtheria, or typhus fever, unless the written permission of the Board is first obtained. Bodies of such persons must be placed in tight coffins and may not be exposed to view.

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Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

KOSMAK'S FIRE ESCAPE.

The apparatus described below is the invention of Mr. Gustav Kosmak, a member of Engine Company No. 6, of the Fire Department of this city. In brief, it consists of a

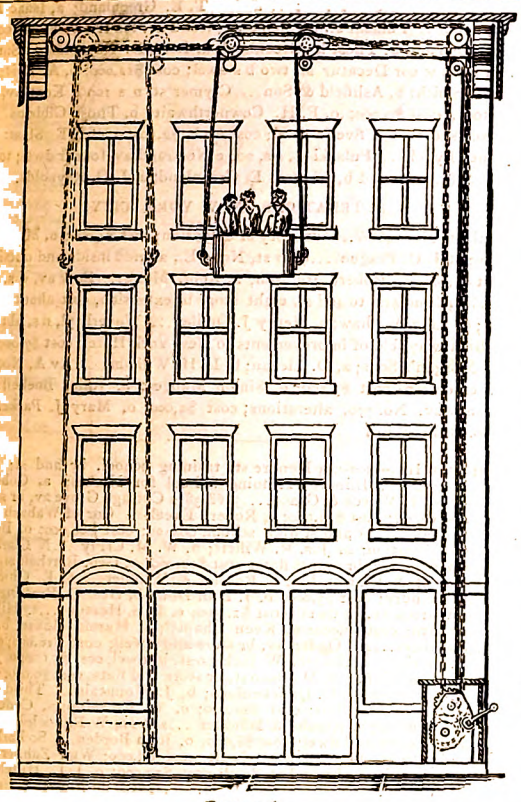

FIGURE 1.

basket or cradle, suspended by ropes or chains from a carriage running on a horizontal track under the cornice at the top of the front of a building, both so connected with

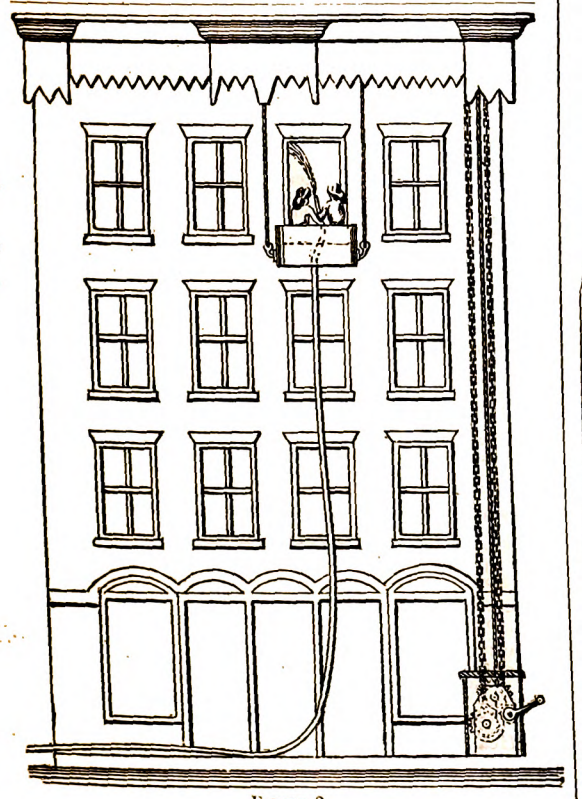

FIGURE 2.

suitable mechanism placed in an easily accessible position that the basket or cradle may be quickly moved to any spot on the face of the wall and persons rescued from any window.

The following explanation of the accompanying drawings makes plain the arrangement and working of the various parts.

Fig. 1 represents the front of a house with the apparatus in use as an escape, the front of the cornice being removed to show roughly the carriage and pulley arrangements behind it.

Fig. 2 shows the cradle occupied by firemen to carry hose to the upper windows. In both, the casing enclosing the chains connecting with the moving machinery at the ground is removed.

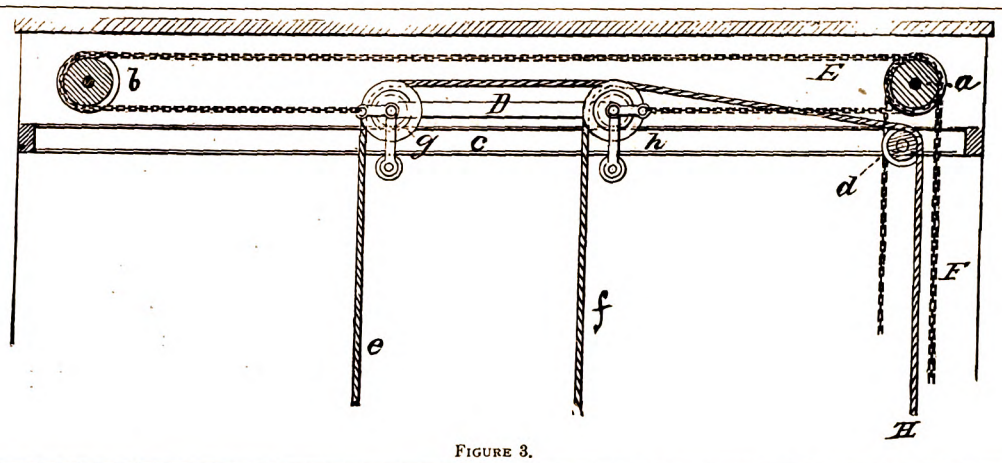

FIGURE 3.

Fig. 3 is a larger face view of the track and carriage beneath the cornice, and Fig. 4 a cross section of the same.

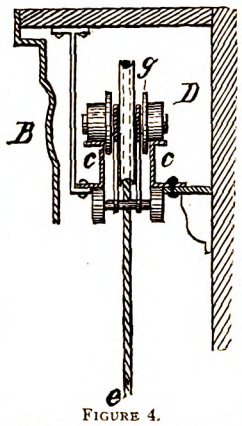

FIGURE 4.

The latter shows how the carriage *D* is supported on the rails *c*, *c*, and hidden and protected by the front of the cornice *B*. To each end of the carriage is attached a chain passing around the pulleys *a* and *b*, which, with the carriage, forms an endless chain, moved back and forth by another endless chain *F* over one of the pulleys *a* connecting with a windlass below. A third chain or rope *H* (the upper part of which is divided into two parts *e* and *f*—one over each of the pulleys *g* and *h* at the ends of the carriage *D*) passing over the pulley *d*, and supporting the basket or cradle, is attached

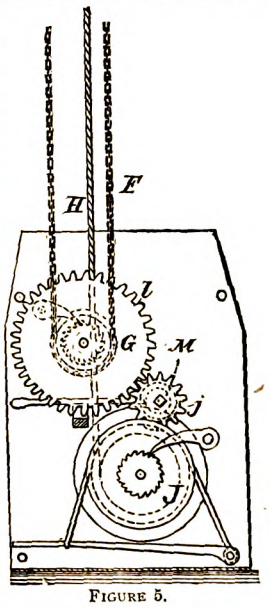

FIGURE 5.

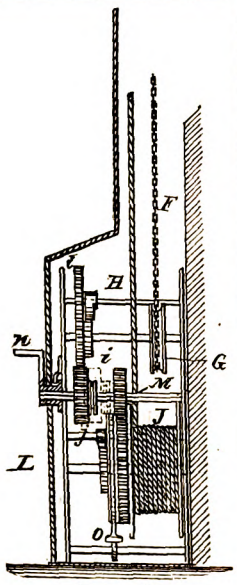

FIGURE 6.

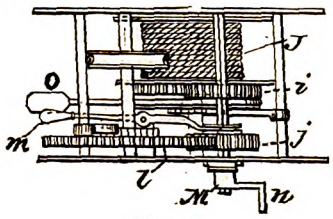

FIGURE 7.

to a second drum at the bottom, which is operated by the same windlass.

The remaining drawings show the machinery for moving the carriage and cradle. This may be placed as shown on the front of the building on a level with the sidewalk, below the sidewalk, or elsewhere, but the inventor prefers the position shown in Figures 1 and 2, where the firemen and policemen could have most direct access to it. It would be kept under lock and key to prevent its illegitimate use by burglars or others.

Fig. 5 is a front view of this machinery; Fig. 6 a side view and Fig. 7 a top view. The windlass shaft *M* (to which is attached the crank *n*) has on it two spur wheels *i* and *j*; the spur wheel *i* is always in gear with a toothed wheel attached to the drum *J* on which is wound the chain or rope *H* attached to the cradle, but the other wheel can be thrown in or out of gear (by the clutch-lever *m*) with a toothed wheel *l* fastened to the shaft to which is also fixed the pulley *G* carrying the endless chain *F* for moving the carriage and cradle horizontally. When the cradle or escape car is to be raised or lowered, the pinion *j* is thrown out of gear, but when it is desired to move the car horizontally *j* is thrown into gear, while *i* still remains in gear, so that both the drum *J* and the pulley *G* are revolved at the same time. The ratios of the diameters of the pinions to the diameters of the toothed wheels are so adjusted, however, that the effect of the rotation of the drum *j* is only to give or take up the slack of the rope *H* sufficiently to allow the horizontal motion without producing any vertical motion of the car. Attached to the drum *J* and the pulley *G* are ratchet wheels to receive pawls for holding the car in any position as long as desired. A foot brake *o* is attached to the drum *J* to regulate the speedy descent of the escape car.

Construction Notes.

We shall always be glad to receive items of interest for this column.

CONTRACTS AWARDED.

KINGS COUNTY, N. Y.—Proposals for alterations and additions to the county almshouse were opened at the office of the Clerk of the Board of Supervisors (court house, Brooklyn), on the 29th ult. The contract for carpenter and mason work was awarded to John Guilfoyle, for $20,580 and that for steam heating apparatus to J. Jacobs & Co., for $4,290. The other bids for steam heating apparatus were as follows:

James Armstrong	$4,500
J. W. Birkett	4,600
Geo. S. Elcock	6,574
H. F. Campbell	5,190
H. O. & W. A. Southard	5,639
Gillis & Geoghegan	4,990

The contract for repairs (chiefly painting) to armories occupied by the Thirteenth and Forty-seventh Regiments was awarded to C. H. Barry for $1,150.

PADUCAH, KY.—A contract amounting to $7,948 was awarded Dec 1, by the Supervising Architect of the Treasury Department to Messrs. Bartlett, Hayward & Co., of Baltimore, Md., for Hot Water Heating Apparatus for court house and post office, at Paducah, Ky.

CHARLESTON, VA.—A contract amounting to $2,326 was awarded by the supervising architect, Dec. 2, to Messrs. Knisely Bros. & Miller, of Chicago, Ill., for slating and galvanized iron work for roof of court house and post office, at Charleston, Va.

NEW YORK CITY.—Nine proposals for the construction of a sewer in Thompson street, between Third and West

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Fourth street, were opened at the Department of Public Works, on Nov. 28, of which two were informal. The lowest bidder was Cornelius Smith, whose bid was $1,183. Twelve proposals were opened at the same time and place for the construction of a sewer in 73d street, between First avenue and avenue A, the lowest of which was by J. D. Miner, whose bid was $7,214.06.

—Schedule of Proposals for Mineral Oil and Lard Oil —opened at the office of the Light House Board, Nov. 28, 1882:

	Mineral Oil Per Gal.				Lard Oil Per Gal.		
	Lot 1.	Lot 2.	Lot 3	Lot 4.	Lot 5.	Lot 6.	Lot 7.
Stope & Co., New York	.....	.....	.....	.....	81 86-100	96 94-100	81 86-100
Fairbank & Co., Chicago	.....	.....	.....	.....	86 69-100	101 19-100	86 69-100
Smith & Co., Philadelphia	15	15	15	15	95 5-10	.....	95 5-10
" "	15	15	15	15 1-2	95 5-10	119	95 5-10
Whittier, Fuller & Co., San Francisco	.....	.....	.....	.....	.....	109 2-10	98 45-100
Manhattan Oil Co., New York	.....	.....	.....	.....	97 2-10	101 3-8	.....
Samuel F. Scofield	.....	.....	.....	.....	.....	.....	.....
Bear Creek Refining Co., Pittsburgh, Pa	18	18	18	18	.....	.....	95
Burchard & Co., Cincinnati, Ohio	.....	.....	.....	.....	.....	.....	.....
Lombard & Oyers, New York	19 1-4	20	21 4-10	23 4-10	.....	.....	.....
Howe Lard Oil Manuf'g Co., New York	.....	.....	.....	.....	.....	.....	93
New York Refining Co., New York	16	16	17	25	.....	.....	.....

Recommended by Light House Board to Secretary of Treasury, that the Lard Oil be given to Stope & Co. Matter of award not yet determined by Secretary for either kind of oil.

NEW YORK.—The following bids for regulating and grading 117th street, between Fourth avenue and Fifth avenue, were opened at the Department of Public Works, on Nov. 28:

D. Dowd	$45,184.20
J. D. Miner	50,848.20
D. K. Gallagher	53,046.00
J. McGuire	55,431.20
W. Rhelan	37,915.40
J. H. Sullivan	43,662.00
P. Farley	35,778.00
J. McKim & Son	45,441.00
J. Slattery	42,665.40
J. H. Casey	36,787.20

The following bids for repairing the pier and bulkhead at the foot of 23d street, East river, were opened at the Department of Docks on the 4th inst:

John Gillies	$9,737
Richard Cronin	11,000
Jos. Walsh	11,400
Flaherty & O'Connell	9,495
John Monks	11,667
Warren Rosevelt	10,977
Frank Pigeon, Jr	24,950
Moses Engle	13,500
James D. Leary	10,989

For repairing the bulkhead and platform at the foot of 130th street and North river, there were four bids, of which that of Jos. Walsh was the lowest, viz., $2,349.

NEW WORK AND MISCELLANEOUS.

CHICAGO.—The Lincoln Park Board of Commissioners, on the 14th ult., directed the Superintendent of the Park to advertise for proposals for heating the refectory by same.

ST. JOHN, N. B.—T. McAvity & Sons are heating the St. John cotton mill with a system of steam pipes designed by a New York engineer. The coils are suspended from the ceilings and the apparatus is to be a gravity return. One of a battery of boilers is set apart for that purpose to be used at any pressure.

MT. MCGREGOR, SARATOGA CO., N. Y.—Proposals for mason work, carpenter work, plumbing and electric bells, for a hotel at Mt. McGregor, will be received by A. W. Fuller, 86 State street, Albany, until Dec, 10.

WASHINGTON, PA.—The Town Council of Washington, Washington Co., Pa., has been discussing the question of water supply. A year or two ago, the Legislature granted a charter to an individual, for the right to supply the town with water, but it appears to have been only a speculative enterprise and nothing has come of it. Any water supply must probably be obtained by pumping from Chartier Creek, which runs near the town. The population is about 6,000,

CHICACO.—The Cook County Electric Light Co. will begin work on the tunnel immediately.

NIAGARA RIVER.—The contract for building the new suspension bridge across Niagara River has been let to the Phœnix Iron Works.

BOSTON.—Proposals for furnishing plumbing materials for the post office and sub-treasury extension will be received at the office of Thos. Brown, Superintendant, until December 12.

ADRIAN, MICHIGAN, has not given up the hope of having water works. The Council are considering a proposition made by some Akron parties to build works and furnish water for public uses at $8,000 per avenue for 100 fire hydrants. The city have the privilege of laying the works inside of five years. The population of Adrian is about 1,100.

NEW YORK.—Estimates for hauling and laying a 48-inch cast iron conduit pipe in Westchester County, also for furnishing stop-cocks, stop-cock boxes and hydrants, will be received by the Department of Public Works, until December 27.

Estimates for flooring and other work on the Fulton Market will be received by the Department of Public Works until Dec. 14.

QUEBEC.—The Mayor and Corporation have appointed an engineer to report on the water supply. The city has received proposals from private parties to buy the water works.

A new water company has been incorporated at Red Bank, N. J. The company will be known as the Shrewsbury Water Company. The incorporators are State Senator Applegate, Judge John L. Wheeler, Anthony Reckless, Treasurer of the New York and Long Branch Railroad Company; Isaac B. Edwards, Cashier of the Second National Bank; Dr. Robert R. Conover, Edward E. Roberts, and J. A. Throckmorton.

THE NEW YORK TRADE SCHOOLS.

The Trade Schools (on First avenue, between 67th and 68th streets) of this city, opened on Monday evening last with about 80 members in the various classes. Many more are expected. There are no day classes, as there were not enough applicants to warrant the establishment of courses of day instruction. The classes in plumbing meet on Monday, Wednesday and Friday evenings. A part of one evening in each week is devoted to the study of the scientific part of the subject. A series of questions on this topic has been prepared, a part of which the instructor answers on these weekly occasions, carefully explaining them by blackboard drawings and requiring students to take notes in blank books furnished them, in which the questions are printed at the heads of pages. From these notes or memory the students are expected to prepare full answers to the questions and hand them in at the following meeting. These questions we hope to present to our readers subsequently. The instruction in plumbing is given by Mr. Hansom under the direction of the following master plumbers: Messrs. Muir, Pearson, Locke, and Byrne.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

West st, s w cor Horatio st, br fac; cost $20,000; o, Mrs. G. R. Hoffman; a, John B. Snook; b, not selected....33d st, No. 21 E., br and stone dwel; cost $26,000; o, Lloyd & Phillip Phenix; a, McKim, Mead & White; b, Robinson & Wallace and Geo. Mulligan....44th st, No. 225, 227 and 229 E., three b st ten; cost each $14,000; o, Joel B. Smith; a, A. Hatfield; b, Smith Bros. & Ellis....45th st, No. 302 E., br fac; cost $10,000; o, H. Kern; a, R. Wirth, Jr....5th av, No. 724 br; cost $50,000; o, Mary A. King; a, McKim, Mead & White; b, W. W. Owens....82d st, s s 203-4 e 3d av, two br st ten; cost each $16,000; o, Alexander Buderus; a, John Brandt....98th st, s s, 100 w 3d av, five br apart houses; cost each $16,000; o, Simon Haberman; a, H. J. Dudley....104th st, s s, 80 w 4th av; four Connecticut b st dwel; cost each $12,000; o, George D. Schmid; a, And. Spence....131st st, s s, 225 w 7th av, five Connecticut b s dwel; cost each $9,000; o, Wm. McReynolds; a, Andrew Spence....3d av, e s, 100 n Grove st on line of 154th st, two fr ten; total cost $6,500; o. Christian Sherding, Jr., a, A. Pieffer; b, not selected.

BROOKLYN.

Himrod st, Nos. 14 and 16, s s, 100 w Evergreen av, two fr dwel; total cost $6,000; o, Mr. Lehmann; a, Th. Engelhardt; b, not selected ....Manhattan av, n w cor Norman av, br store and dwel; cost $8,000; o; Adrian Meserole; a, Fred. Webber; b, G. J. Roberts and Stephen M. Randall....Nostrand av, s w cor Lexington av, five br ten; cost $8,000 each, corner $10,000; o, J. P. Hudson; a, Thomas Welwood; b, Philip Sullivan and Francis Weeks ...Vernon av, n s, 325 w Marcy av, four fr dwel; total cost $18,000; o, and b, T. E. Greenland; a, Isaac D. Reynolds... Pulaski st, n s; 100 e Nostrand av. ten fr dwel; total cost $45,000; o and b, Thos. E. Greenland; a, Isaac D. Reynolds....Summer av. s w cor Decatur st, two b s dwel; cost $12,000; o, A. Post; a, C. H. Smith; b, Ashfield & Son....Clymer st, n s 100 e Kent av, br factory, cost $9,000; o, F. H. Cowperthwait: b, Thos. Gibbons.... Kosciusko st, n s, five fr dwel; cost each $2,500; o, etc., F. Sloat; m, James Lynch....Pulaski st, s s, 200 e Nostrand av, four fr dwel; total cost $18,000; o, and b, Thomas E. Greenland; a, I. D. Reynolds.

ALTERATIONS, NEW YORK CITY.

4th st, No. 146 W., four story br extension; cost $4,000; o, M. Coleman; a, J. G. Prague....90th st, No. 7 E., altered inside and outside; cost $3,000; o, Robert Johnson; a, Robt. Mook....Park av, e s, extending from 41st to 42d st, eight story br extension, cost about $45,000; o, Julia A. Shaw; a, Henry J. Dudley....Waverly pl, n s, abt 100 w Broadway, bld of improvements to New York Hotel; cost $7,000; o, M. Morgan's Sons; a, D. Lienau; b, L. H. Williams....Av A, No, 81, br extension, cost $3,500; o, Simon Manges; a, Julius Boekell.... Broadway, No. 770, alterations; cost $2,000; o, Mary J. Parker; a, Jno. B. Franklin.

CHICAGO, ILL.—302-304 Honore st, training school, br and st; cost $20,000; o, Illinois Training School for Nurses; a, Cobb & Frost; b, Weeck & Grace....3868-3872 Cottage Grove av, br store and dwell; cost $14,000; o, Robert Excell....Cor of Wabash ave and 26th st, br and st high school, 90x120; cost $80,000; o, Board of Education; a, Jas. R. Willett; b, W. M. Crilly....N Clark nr Garfield ave, br and st flats; cost $12,000; o, Geo. Bartholomal; a, Cudell & Blumenthal; b, Roesler & Winkler....64 E. Ohio st, br foundry; cost $5,000; o, J. Hall Dow; b, Geo. C. Prussing.... 9 Warren av, br dwell; cost $1, 500; o, E. S. Heaton....67 Hill st, br barn; cost $5,000; o, Keen Chapell; a, Harold House, b, G. Soeffker....485 Ogden av, br store and dwell; cost $10,000; o, F. B. Clarke....1180-1182 W Jackson st, br dwel; cost $5,000; o, Jno. Coumbe....805 W Madison st, br store and flats; cost $9,000; o, J. F. Tenny; a, L. G. Quackenboss; b, J. Mountain....Third ave, nr Taylor, br flats; cost $12,000; o, W. C. Seipp; a, Cudell & Blumenthal; b, Roesler & Winkler ...208-214 W Randolph st, br, add to store and dwel; cost $8,000; o, John Borden....So Park av, and 39th st, br store and dwel; cost $5,000; Wm. Zahner.... 2641 Prairie st, br and st dwel; cost $12,000; o, J. L. Hutchingt a, Burnham & Root; b, "C. L H."... 2638 Prairie st, br and s. dwel; cost $12,000; o, J. L. Hutching; a, Burnham & Root; b, "C. L. H."....630-632 N Franklin st, br factory; cost $25,000; o, A. B. Fredler; a, Theo. Karls; b, Geo. Kobbel.

OTTUMWA, IOWA.—Fr residence; cost $11,000; o, J. Dagett; a, Treat & Foly.

CHEROKEE, IOWA.—Br store with Masonic lodge above; cost $15,000; o, Allenson Bros.; a, Treat & Foly.

NEAR PHILADELPHIA, PA.—Granite residence; cost $60,000; o, Edward Williams; a, Treat & Foly.

OAK PARK, ILL.—Br and st church; cost $11,000; o, Grace Episcopal Parish; a, Treat & Foly....br and st church; cost $14,000; o, First Baptist Church; a, Treat & Foly.

JEFFERSON, ILL.—Br hotel; cost $12,000; o, D. Jennings; a, J. H Huber.

RAVENSWOOD, ILL.—Br store and dwel; cost $10,000; o, D. P Breeze; a, J. H. Huber....br residence; cost $9,000; o, H. H. Anderson; a, J. H. Huber....br residence; cost $5,000; o, F. Field; a, J. H. Huber.

HYDE PARK, ILL.—Br and st residence; cost $6,000; o, J. J. Sherman; a, Wheelock & Clay....br and st residence; cost $6,000; o, W. E. Giles; a, Wheelock & Clay....br and st residence; cost $6,000; o, E. H. Turner; a, Wheelock & Clay....br and st residence; cost $7,000; o, N. P. Smith; a, Wheelock & Clay.

KENWOOD, ILL—Penn stone dwel; $20,000; o, D. G. Bradley; a, Wheelock & Clay.

BOSTON, MASS.—Nos. 21, 23 and 25 Claremont Park, three b dwell; o; and b Samuel Stubbs....East Eagle and Putnam, two fr dwells, o, Albert G. Rice; b, Nathaniel Littlefield....East Eagle and Putnam, two frame dwells; o. S. A. Bennet; b, Nathaniel Littlefield .. Crescent av, two fr dwells; o, Washington V. Tuckerman; b, Henry P. Oakman....Grant st, two fr dwell; o and b, same as last.

BUFFALO, N. Y.—Washington, nr Genesee st, b store; cost $6,000; o, Henry Diller; a, H. H. Little....North st, b residence; cost $15,000; o, Seth P. Bliss; a, E. L. Holmes; North st, b stable; cost $3,900: o and a, same as last... North st, b residence; cost $25,000; o, J. F; Hayers; a, M. E. Beebe.

KANSAS CITY.—No. 1001 McGee st, K. C. Educational Association; cost $6,000.

WASHINGTON.—Q, bet 15th and 16th sts, two b houses; cost $10,000. o and a, F. W. Pilling....H, bet 17th and 18th sts, b house; cost $16,000; o, Thos. Kinney; a, Gray & Page.

Health Officer Hunt, of Utica, has addressed a communication to the Common Council asking that a hospital in which contagious diseases can be cared for, be erected.

Gas has slain its thousands and the can of kerosene its tens of thousands.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING NOVEMBER 25, 1882.

(COMPILED FROM DATA PLACED AT OUR DISPOSAL BY THE NATIONAL BOARD OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland.....Maine	34,390	18	27.1	4	22.2			6			1					1								
Boston.....Mass	399,446	166	21 3	37	22.3	10		40	2	4	14	1	4		3	13		11					1	
Cambridge.....Mass	56,566	14	12 5	3	21.4			3			3		2			1								
*Worcester.....Mass																								
*New Haven.....Conn																								
Providence.....R. I.	111,987	62	28.6	9	14.5	4		8	3		1		14		2	3		2						
Total	602,389	270	22 9	53	19.6	14		57	5	4	19	1	20		5	18		13					1	
EASTERN CITIES.																								
Albany.....New York	97,035	52	27.5	25	46.1			4	3	2	2		1		8	2	1	1		7	1			
New York.....New York	1,282,349	553	22 4	195	35.2	22	4	91	15	17	24		6	12	7	50		30		5	5		8	
Brooklyn.....New York	621,563	221	18.1	79	35.7	11		34	9	6	12		3	4	12	20	1	12	2		4		4	
Hudson Co.....New Jersey	222,675	100	22.9	42	42.0	1	1	13	6		2		3	1	4	6		7		2	11			
*Newark.....New Jersey																								
*Camden.....New Jersey																								
Philadelphia.....Pa.	896,157	349	19.7	107	30.6	10		65	19		29		3		6	21	5	7	2			4		
*Reading.....Pa.																								
Wilmington.....Delaware	46,087	18	20 3	2	11.1			4	2		1		1		1		1							
Total	3,165,866	1,293	20.8	450	34.8	44	5	211	54	25	70		17	17	32	99	8	57	4	14	21	4	12	
LAKE CITIES.																								
Buffalo.....New York	166,235	80	25.0	24		4	2	6	3		15		6		9	1	1				1			
Rochester.....New York	91,616	37	20 8	11	29 9			5	1	1	2		2	1		4		1						
Syracuse.....New York	54,168	9	8.3	2	22.2	1		1	2							2					1			
*Cleveland.....Ohio																								
Detroit.....Michigan	128,431	66	26 5	22	33.3			6	4	2	12			2	7	1		2			1			
Chicago.....Illinois	580,625	178	15 6	76	42.0	4		14	5	5	7	2	11	3	11	16	2	9		1	4	2	2	
Milwaukee.....Wisconsin	131,661	42	16 2	22	52.3			4		1	4				1	2		1						
Total	1,152,736	412	18.1	157	38 1	9	2	36	15	9	40	2	19	6	28	26	3	13		1	7	2	2	
RIVER CITIES.																								
*Allegheny.....Pa.																								
*Pittsburgh.....Pa																								
Cincinnati.....Ohio	265,471	93	18.2	34	36 5	2		14	3	1	3	1	2		7	5		10						
Dayton.....Ohio	41,108	9	11.3	2	22 2	1		3																
*Louisville.....Ky.																								
Indianapolis.....Indiana	84,443	24	14.5	6	25.0	2		6		2			1	1		1								
*Terre Haute.....Indiana																								
Minneapolis.....Minn	88,728	32	18.7	9	28.1			1		1	9		7			3	1							
St. Paul.....Minn	51,463	20	19.7	10	50.0			1	1		2		2			1								
Total	531,213	178	17.1	61	34.2	5		25	4	4	14	1	12	1	7	10	1	10						
PACIFIC CITIES.																								
*San Francisco.....Cal																								
Total																								
SOUTHERN CITIES.																								
District of Columbia.. " " Wh.	134,042	35	13.5	11				3		1	3		1		1	3		1						
" " Col	69,663	23	17.1	15				2			1					6		2						
Richmond, Va. Wh.	38,024	11	14 5	3	27 2			3						1		1					1			
" " Col.	29,110	12	21 3	9	75 0	1				1						2								
Charleston.....S. C. Wh.	22,699	15	34 4	3	20 0	1					6		1	1				1						
" " Col.	27,537	18	35 4	7	38.9			7					1	1		1	1	1						
Atlanta.....Ga. Wh.	24,764	11	22 9	4	36.3			3		1	2		2											
" " Col	18,695	10	27.5	4	40.0			1	2							1								
*Savannah.....Ga. Wh.																								
" " Col																								
Nashville.....Tenn. Wh.	31,086	9	14 5	4	44 4	1		1			1		1											
" " Col	18,848	16	44.7	4	25.0			4						1		1								
*Memphis.....Tenn. Wh.																								
" " Col																								
*Mobile.....Ala. Wh.																								
" " Col																								
New Orleans.....La. Wh.	162,777	76	23 9	23		1	1	11		6				4		6		1					1	
" " Col.	59,457	45	39.0	14		2		8		1				4		4					1	1		
Total White	432,064	157	18 7	48	33.5	3	1	21		8	12		5	7	1	11		3			1		1	
Total Colored	282,206	124	27.0	53	42.7	8		22	2	2	1		1	6		7	1	4			1	1		
Total in 27 U. S. Cities	6,122,479	2,434	20.3	822	33.3	78	8	373	80	52	156	4	74	37	79	181	13	110	4	15	30	7	17	
Nov. 11—Total in 28 English Cities	8,469,571	3,522	21 7			115				59	27		98		131					101		6	46	
" " " 8 Scotch "	1,219,586	517	22.0			19				21	25		11		5					12			15	
Nov. 11 " 16 Irish "	843,553	393	24.2			3		49		7	1		6		9					10		1	3	
Sept. 21 " German "	8,539 233	3,654	22.3	1786		46		481	21	307	175		73		113	253				54	30		50	

*The reports from Pittsburgh and Memphis could not be used, as the total number of deaths was not given.

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Notes and Abstracts.

For the week ending November 25, of a total urban population of 6,122,479, there died 2,434, corresponding to an annual death rate of 20.3 per 1,000, a little less than the preceding week, which was 20.8. The lowest death rate was in the River cities, where it was 17.1, and it continues low in the Lake region. Of the total number of deaths 33.3 per cent, were of children under five years of age. Diphtheria caused 29 deaths in Philadelphia, 15 in Buffalo, 12 in Detroit, and nine in Minneapolis. Small-pox caused deaths in Philadelphia, Chicago and New Orleans.

Taking the sum of the reports for the last five weeks, we find that for an average urban population of 5,923,747, the deaths were equivalent to an annual mortality of 20.4 per 1,000. For the same period in the North Atlantic cities the rate was 19.7; for the Eastern group, 21.4; for the Lake region, 17.8; for the River cities 19.3; and for the Southern cities—whites 18.8, colored 31.6. The deaths under five years were 35 per cent. of the whole, the lake and River cities, and the Southern blacks being above the average. The total number of deaths during this period from consumption was 1,727, being 14.5 per cent. of the whole. Acute lung diseases caused 10.3 per cent. of all deaths. Diphtheria 6.04 per cent., and typhoid fever 3.7 per cent. No deaths from measles were reported during these five weeks in the North Atlantic or the Southern cities. Small-pox in the Southern cities has been confined to the colored population. Only five deaths from puerperal diseases are reported in Southern cities; 16.9 per cent. of deaths of the colored population of these cities was caused by consumption, which disease caused 17.6 per cent. of the deaths in the North Atlantic cities, and only 10.8 per cent. in the Lake group.

BOSTON, MASS.—C. E. Davis, Jr., reports 65 cases of diphtheria, 28 of scarlet fever, and 14 of typhoid.

ALBANY, N. Y.—Health Officer, Daniel V. O'Leary, reports the prevailing diseases as scarlet fever, measles, and diphtheria.

DETROIT, MICH.—Dr. O. W. Wight reports 36 cases of scarlet fever and 87 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 24 new cases of scarlet fever and 49 on hand; nine new cases of diphtheria and 29 on hand.

PITTSBURGH, PA.—Dr. Snively reports seven new cases of small-pox.

DAYTON, OHIO.—Dr. E. B. Davis sends delayed report for week ending Nov. 18. Total deaths six, under five years two. The only entry under the headings of our statistical table is, *Accidents* one.

INDIANAPOLIS, IND.—Dr. E. S. Elder reports several cases of scarlet fever, but no deaths from that disease during the week.

ROCK ISLAND, ILL.—G. G. Craig, Commissioner of Health, reports three deaths during the week, none under five years; population 11,650; no zymotic diseases.

JACKSONVILLE, FLA.—In reporting a death from *old age*, Health Officer, A. W. Knight, states the age as 103 by report.

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SANDWICH, ILL.—Dr. Nahum E. Ballou reports the continuance of measles.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin's report shows 14 admissions, ten discharges, four deaths, and 1,346 remaining under treatment.

NEW YORK CITY.—The monthly report of Dr. B. H. McCann, the examining physician for the Board of Commissioners of Public Charities and Correction, shows that during the month 1,477 applicants for medical relief were examined, of which 14.55 were admitted to hospitals. Of these, 108 were cases of general diseases, 114 of fevers, 236 of diseases of the respiratory organs, 443 were surgical cases, and 142 of alcoholism. The number of male adults was 870, of female adults 580, and of children 5.

BALTIMORE.—The total number of deaths for the week ending Nov. 25 was 157, of which there were 132 white, and 25 colored. The Health Officer reports from this the annual death rate as 19.96 per 1,000—being for whites 19.66, and for colored 26.66. The true death rate was about 23.4. There were 21 deaths from small-pox, 21 from consumption, seven from croup, 25 from diphtheria, one from malarial fever, and one from typhoid fever, four from scarlet fever, and seven from pneumonia. The number of deaths under five years was 76, or over 50 per cent. of the whole number of deaths.

DETROIT, MICH.—The immigrant inspector's report of Dr. J. J. Mulheron shows for the week ending Nov. 25, the interception of 682 immigrants, of whom 623 were found protected; 59 required vaccination; of these five were primary cases.

PORT HURON, MICH.—The immigrant report of Dr. H. R. Mills, for the week ending Nov. 25, shows that 684 inspections were made, and 468 vaccinations performed. Most of these were Canadians; 128 were found protected by a previous attack of small-pox, and only 80 by vaccination: 98 primary vaccinations were performed, 63 of the cases being over five years of age.

PROVIDENCE, R. I.—Dr. E. M. Snow reports the typhoid epidemic as decreasing. There were 103 cases of the disease reported during the week, but of these only 16 were new cases—that is, cases which began during the week. During the period from Oct. 1 to Nov. 25, there have been 431 cases.

DISTRICT OF COLUMBIA.—Dr. Smith Townsend reports that during the month of October there were 356 deaths, equivalent to an annual rate of 22.58 per 1,000. This rate is 72 less than the mean death rate for October during the past nine years. Of the decedents 180 were white, and 176 colored; white rate 17.32; colored 32.78. Children under five years constituted 39 per cent. of the total mortality. There were 56 deaths from consumption, 18 from malarial fever, nine from typho-malarial fever, 17 from typhoid, 13 from diphtheria, three from croup, three from scarlet fever, and one from cerebro-spinal fever.

MICHIGAN.—Dr. H. B. Baker, Secretary State Board of Health, reports, as the results of observations of 53 observers in different parts of the State, the following diseases in the week ending Nov. 18 in the order of greatest area of prevalence: neuralgia, rheumatism, intermittent fever, bronchitis, consumption, and tonsillitis. The reports show an increase in the areas of typhoid fever, pneumonia, and neuralgia. Diphtheria was reported present at 24 places, scarlet fever at 13, measles at three, and small-pox at two places.

CALIFORNIA.—Dr. F. W. Hatch, Secretary State Board of Health, transmits the Monthly Circular for October, dated Nov. 13. The mortality table is confined mainly to localities in the interior of the State, the large cities of the coast not having been heard from at the date of issue. In a population of 94,372 there were 116 deaths, equal to an annual rate of 14.76. Of these, 24 were caused by consumption, nine by acute lung diseases, three by diarrhœa, three by cholera infantum, three by typhoid, three by malarial fevers, two by croup, and one by diphtheria. There were no deaths from scarlet fever, measles, small-pox, or whooping cough. But one case of diphtheria is reported from Sacramento, this being the only contagious disease noticed in the reports from sixteen localities.

ONTARIO, CANADA.—The weekly Health Bulletin of the province shows the following diseases in the order of prevalence during the week ending Nov. 18: Bronchitis, neuralgia, influenza, anæmia, diarrhœa, and consumption.

BERMUDA, WEST INDIES.—Consul Charles M. Allen, under date of Nov. 14, states that the fever heretofore reported continues to some extent; no deaths have occurred from it. A physician is rarely employed, and the patient is sometimes not even confined to his house.

SANTIAGO DE CUBA.—Consul Landreau reports for the month of October, 44 cases of yellow fever and 31 deaths from the disease. The harbor and its vicinity are not inspected.

AUX CAYES, HAITI.—Thomas Dutton, Consular Agent, reports a total of 12 deaths during the week ending October 28. Of these seven were caused by small-pox. No cases of yellow fever are reported.

VICTORIA, VANCOUVER'S ISLAND, B. C.—Consul Allen Francis reports the prevailing diseases during the week ending Nov. 11, as typhoid fever, pheumonia, and diphtheria. Small-pox is said to be present among the Indians on the mainland.

ENGLAND.—The return of the Registrar-General for the week ending Nov. 11, shows the average mortality rate in 28 towns to have been 21.7 per 1,000; lowest rate in Brighton, 12.9; highest in Sunderland, 32.4; London, 20.0. The 27 deaths from diphtheria in 28 towns included 19 in London. Small-pox caused four deaths in London, one in Wolverhampton and one in Newcastle-upon-Tyne. In London there were 217 deaths from zymotic diseases in a total of 1,493. In addition to the deaths from small-pox and diphtheria already mentioned there were 57 from measles, 70 from scarlet fever, 13 from whooping cough, one from typhus, 32 from typhoid, four from ill-defined forms of continued fever and 17 from diarrhœa and dysentery.

SCOTLAND—Consul Leonard transmits the Registrar-General's return for the week ending Nov. 11. The aggregates appear in our statistical table of the eight principal towns, giving an average rate of 22.0 per 1,000; the lowest mortality was recorded in Leith, viz., 16.4, and the highest in Dundee, 27.2, in which town measles, diphtheria and whooping cough are prevalent.

IRELAND.—Consul A. B. Wood, of Belfast, sends the Registrar-General's return for the week ending Nov. 11, the aggregates of which will be found in our weekly table. Typhus caused six deaths, of which three occurred in Dublin, two in Cork and one in Londonderry. The death from small-pox occurred in Belfast. The deaths from scarlet fever were confined to Dublin and Belfast.

ST. PETERSBURG, RUSSIA.—Consul-General Edgon Staunton reports for the week ending Oct. 28, a mortality of 526; males, 286; females, 240; under five years, 240. Small-pox caused nine deaths, typhus one, and typhoid 10 deaths. The patients in hospitals on the 29th numbered 5,823; among these were 458 cases of fever, 55 of small-pox and 1,134 of venereal diseases.

ROTTERDAM, NETHERLANDS.—Consul John F. Winter reports 11 cases of small-pox and four deaths from the disease during the week ending Nov. 11.

SPAIN.—The statistical bulletin for the month of July last for the Spanish peninsula reports 41,965 deaths, being an annual mortality rate of 24.9 per 1,000. Twelve hundred and ninety-five deaths were due to small-pox, which caused 30.8 out of every 1,000 deaths. Typhoid fever caused 10.96, intermittent fever, 10.89; and consumption, 46.04 per 1,000 of all deaths.

WARSAW, RUSSIAN POLAND.—Consul Rawicz reports 17 deaths from small-pox during the week ending Oct. 28.

CONSTANTINOPLE.—Consul-General G. H. Heap, under date of Nov. 7, transmits copies of telegrams received by the sanitary administration of the Ottoman Empire announcing the appearance of cholera among the pilgrims at Mecca, on Oct. 24. All precautions are being taken at the quarantine stations on the Red Sea.

JEDDAH, RED SEA.—Under date Oct. 31, Dr. Wortabetz reports that cholera has broken out once more this year at Mecca. On the 24th of the month, two days after the great feast of Kouzbaw Bairam cases of the disease were seen and up to the 26th 10 proved fatal. It is said, however, that the present outbreak is a mild one. The disease was brought to Jeddah on the 27th by pilgrims from Mecca. One death occurred on the 28th, one on the 29th and one on the 31st. At Mecca, up to and including the 29th, 159 deaths had occurred.

BOMBAY, INDIA.—Consul B. F. Farnham sends reports for the weeks ending Oct. 10 and 17. During the former there were 402 deaths, giving a ratio of 24.0; 88 of these deaths were from remittent fever. During the latter there were 401 deaths giving a ratio of 23.94; 67 were from remittent fever.

MADRAS, INDIA.—Consular Agent, L. Strange, reports for the week ending Oct. 13, 228 deaths in a population of 397,552, giving a ratio per mille per annum of 29.8. Fevers caused 61 deaths, dysentery 29, diarrhœa 16, small-pox four and measles one. No deaths are recorded from cholera. In the report for the following week ending Oct. 20, the ratio is 33.7. The total deaths were 258, of which 67 were caused by fevers, 31 by dysentery, 10 by diarrhœa and 6 by small-pox. No cholera.

CALCUTTA, INDIA.—Consul General H. Mattson sends reports for the weeks ending Sept. 30 and Oct. 7. During the former 225 deaths occurred, during the latter 204, giving the respective rates of 27.1 and 24.5 per 1,000. The reports show 20 deaths from cholera, 15 from typhoid fever, 58 from diarrhœal diseases, 62 from tetanus, 17 from consumption and 1 from diphtheria.

BATAVIA, JAVA.—Consul Oscar Hatfield transmits two cholera reports from the province of Sourabaya for the ten days ending Sept. 10 and 20. The former shows four cases carried forward from the previous report and 66 new cases, making 70, of whom 60 died, 8 recovered and two remained under treatment. The latter shows 73 new cases, making 75, with those remaining from the previous week; of these 58 died, 8 recovered and 9 remained under treatment. Consul Hatfield also sends a consolidated report from all the provinces of the Island for the month of July, showing 2,278 new cases of cholera and 1,294 deaths from the disease.

Twenty cases of typhoid fever have occurred in East Dedham. The doctors find the cause in impure water and imperfect sewerage.

A CORRECTION.—In noticing the closets provided by the Brown & Sharpe Manufacturing Co. last week we gave their location as Hartford, Ct. We should have said Providence, R. I.

Tables showing the number of new patients at six New York City Dispensaries, for the week ending Nov. 25th, 1882, with some of the principal acute diseases:

Name of Dispensary.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Total.	
Northern Dispensary	30	16	49	21	15	10	141	Acute Diseases.
	5	5	5	4	2	4	25	Chronic Dis'es & Surg. Cases.
Bureau Med. Relief, Dpt Char. & Corrections.	39	33	40	51	48	30	241	Acute Diseases.
	49	38	53	50	73	44	307	Chronic Dis'es & Surg. Cases.
North Eastern Dispensary	46	43	35	55	52	39	270	Acute Diseases.
	31	34	32	24	34	29	184	Chronic Dis'es & Surg. Cases.
New York Dispensary	28	38	18	29	28	24	165	Acute Diseases.
	46	39	40	29	36	15	205	Chronic Dis'es & Surg. Cases.
North Western Dispensary	43	27	29	28	18	19	164	Acute Diseases.
	32	28	25	31	25	27	168	Chronic Dis'es & Surg. Cases.
Demilt Dispensary	23	22	20	27	25	15	132	Acute Diseases.
	43	54	47	37	48	37	266	Chronic Dis'es & Surg. Cases.
Total.....	209	179	191	211	186	137	1113	Acute Diseases.
	206	198	202	175	218	156	1155	Chronic Dis'es & Surg. Cases.

Name of Dispensary.	Total New Patients.	Under 5 Years.	Males.	Females.	Whooping Cough.	Malarial Fever.	Diarrhœal Diseases.	Acute Lung Diseases.	Brain Diseases.
Northern Dispensary.....	166	11	47	119	5	9	5	39	[illegible]
Bureau of Med. Relief, Dept. Charities & Corr'c'n	548	86	234	284	17	48	3	113	[illegible]
North Eastern Dispensary	454	109	196	258	3	12	11	59	1
New York Dispensary	370	33	165	205	1	18	10	71	....
North Western Dispensary	232	26	136	196	....	17	5	77	....
Demilt Dispensary.....	398	63	155	243	10	10	1	89	3
Western Dispensary.....	....	....	....	....	....	....	....	....	....
Total.....	....	....	....	....	....	114	....	448	[illegible]

Six New York Dispensaries have furnished reports for the week ending November 25th. These report 2,268 new cases, of which 1,113 were of acute diseases. The proportion of lung diseases has increased from the preceding week; the malarial fevers have markedly diminished; 5 cases of diphtheria and 5 cases of tonsillitis are reported.

"ST. NICHOLAS."

The Christmas number of the "St. Nicholas" is filled with cheer and spice for Christmas tide. The frontispiece "with the compliments of St. Nicholas," is bright with color, and children will read with delight the stories, some full of the fantastic imagery of fiction, or others that are "really true," and even children of a larger growth may declare with the grotesque lad in the Letter Box, "There isn't a dry page in it." The contents embrace "The Story of Viteau," and "The Banished King," from the pen of Frank R. Stockton. "Christmas Fairies" that come in the shape of silver pieces. "The Mammoth of St. Petersburg," J. G. Francis "Changing a Face," a noteworthy sketch of the little "mice muscles" that creep about so many childish faces, and often spoil their sweetness. "The Field of the Cloth of Gold," by E. S. Brooks, a number of poems brief and pithy, illustrations to suit humors grave and gay, and a Christmas Carol.

The publisher of THE SANITARY ENGINEER will esteem it a favor if names of persons likely to be interested in the journal are sent to him, in order that he may send them specimen copies.

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Citrate of Iron and Ammonium, U. S. P.; Citrate of Iron and Strychnine, U. S. P.; Citrate of Iron, Quinine and Strychnine.—10 per cent. Quinine, 1 per cent. Strychnine, with Ammonia.

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We expect that consumers will, and, indeed, they have, sustained us in taking this stand. Reputable dealers prefer to sell only full weight and genuine goods. Competition from the unscrupulous sometimes induces them to keep good, bad, and indifferent. We rely on the intelligence of consumers to encourage them to keep first-class articles. Ask therefore for

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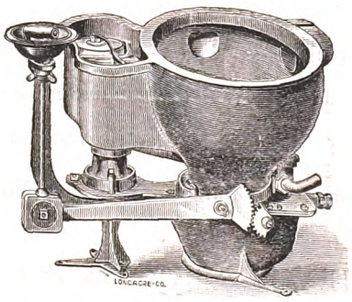

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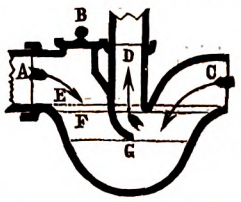

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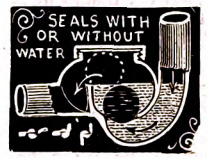

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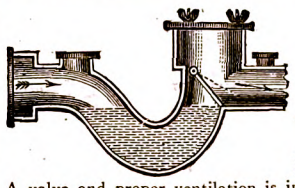

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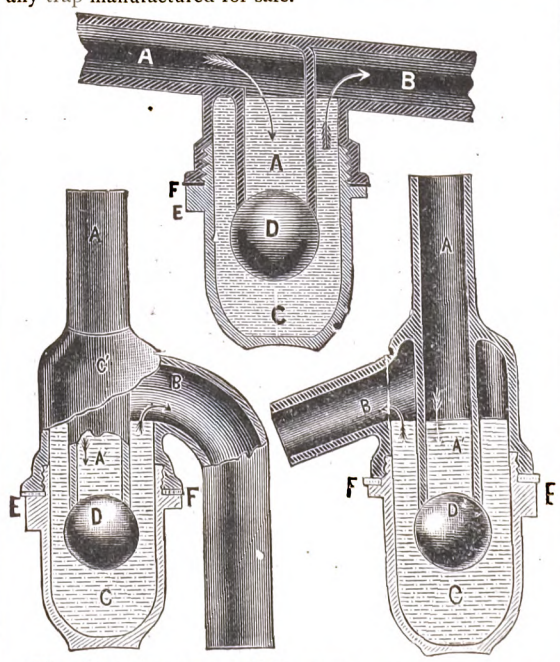

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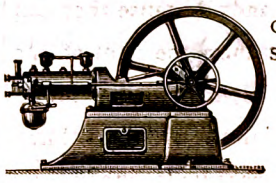

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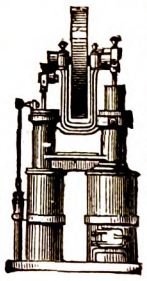

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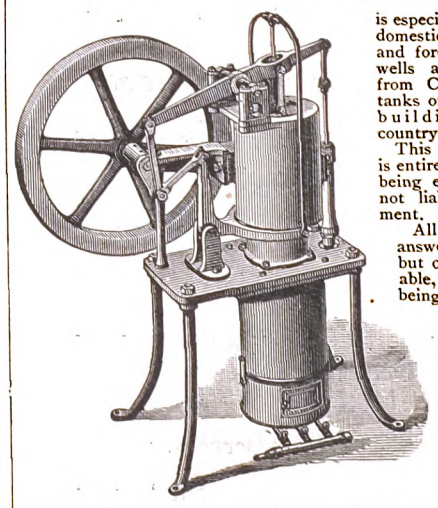

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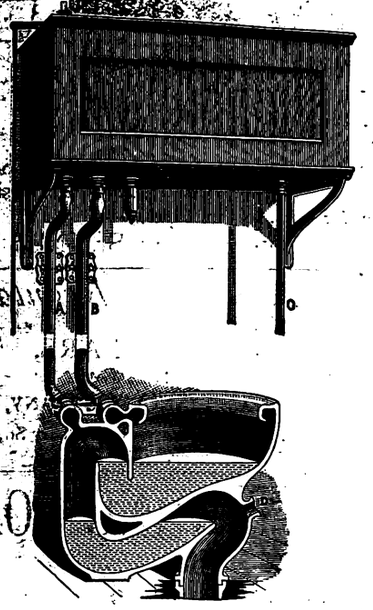

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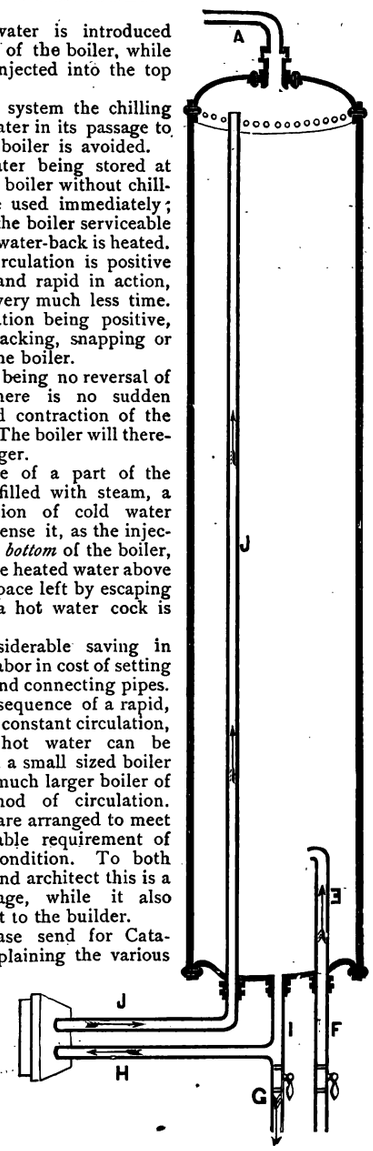

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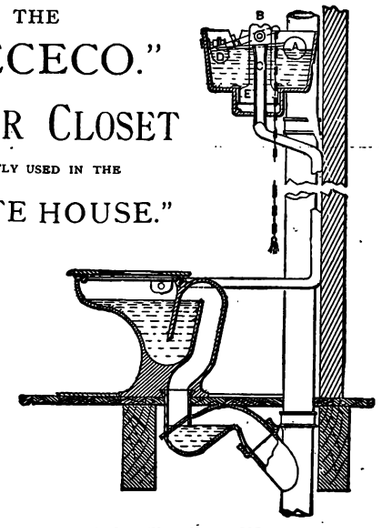

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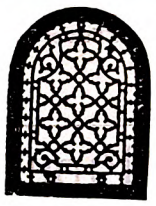

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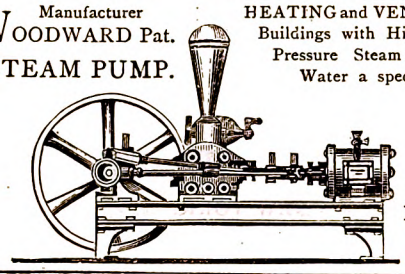

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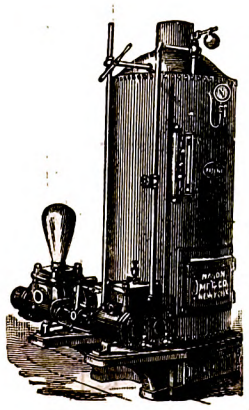

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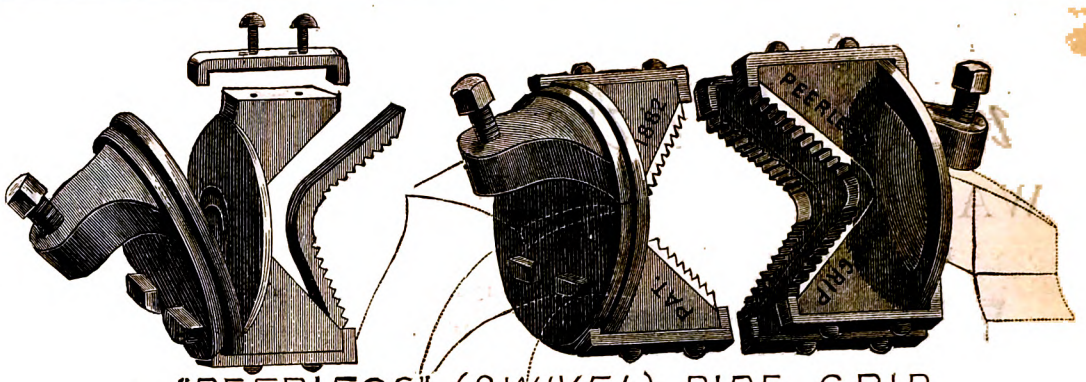

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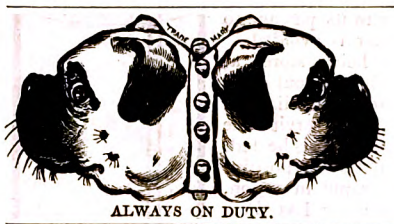

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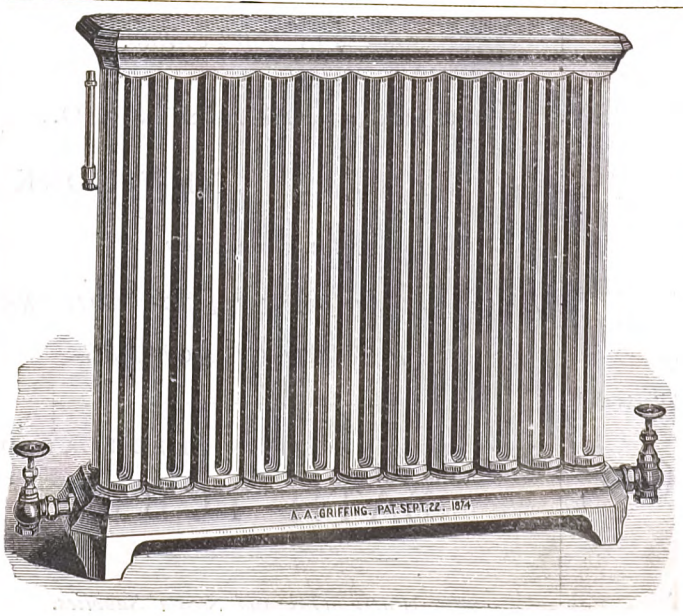

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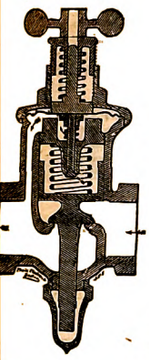

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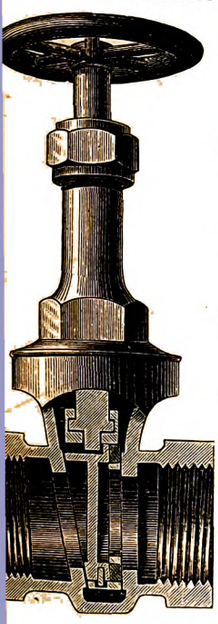

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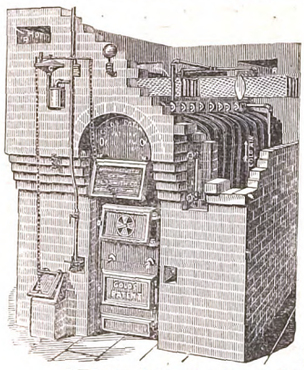

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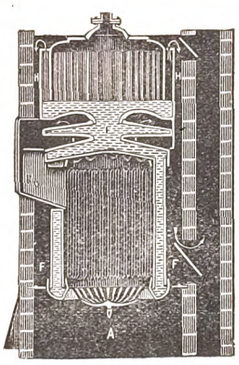

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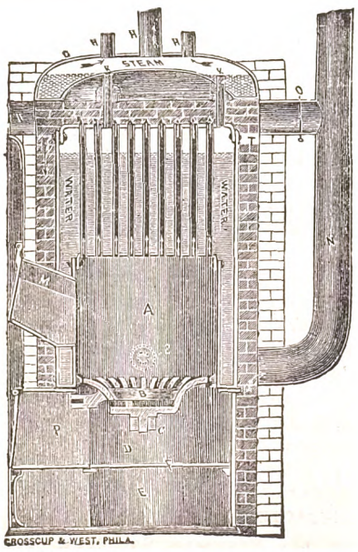

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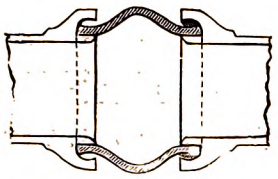

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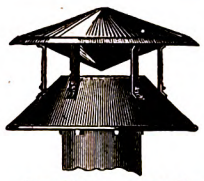

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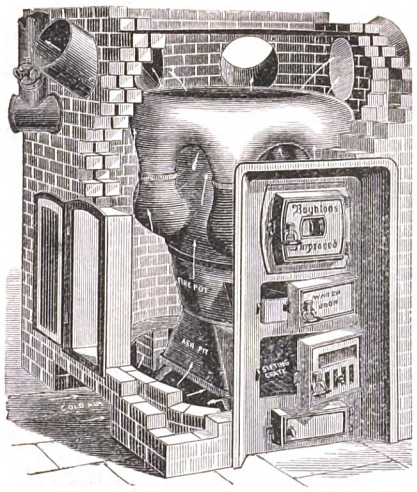

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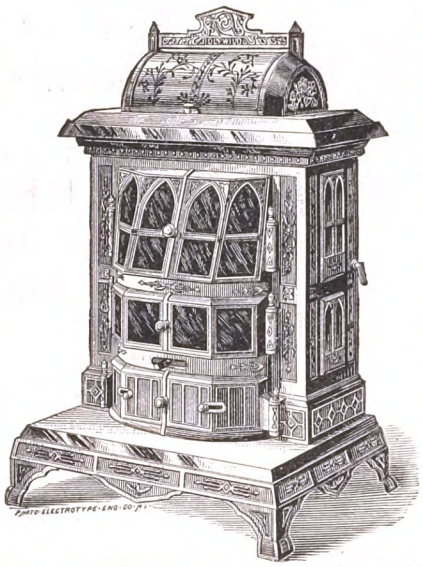

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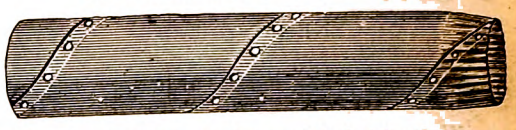

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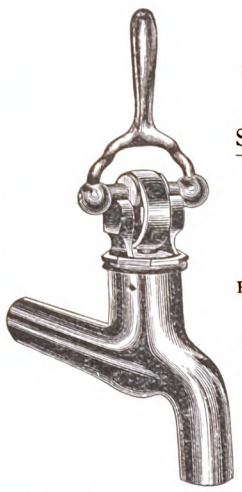

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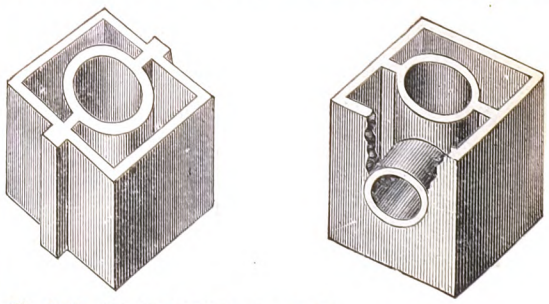

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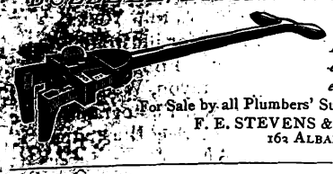

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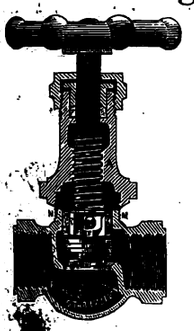

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By examining the sectional cut, it will be seen that the bottom of the bowl is covered with water, while the flush and shape of the bowl is such that the trunk on the back is kept clean.

It is attractive in appearance, being all in one piece, of white earthenware.

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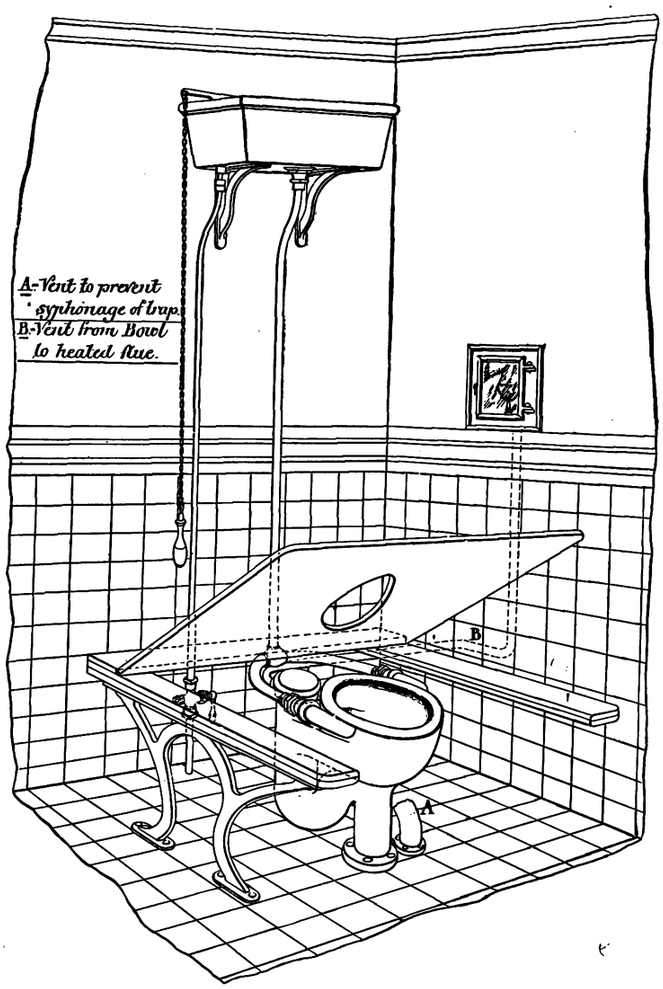

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The Sanitary Engineer.

VOLUME 7.
NUMBER 1.

SUPPLEMENT.

NEW YORK,
DEC. 7, 1882.

OFFICIAL SUPERVISION OF PLUMBING IN WASHINGTON.

We give below very full abstracts of the report of Mr. Samuel A. Robinson, the Inspector of Plumbing of the District of Columbia, to the Health Officer of the District. Some portions of the report may be considered as somewhat elementary, yet we presume it was written for the householders of the District, who evidently need instruction. An examination of the illustrations we reproduce on the following pages should convince every one of the necessity of official supervision of plumbing.

We have taken some pains to inquire into the character of the services rendered by Mr. Robinson, and are satisfied that he is doing a most valuable work for the citizens of Washington.

His report reads as though it were written by a man who took an interest in his work. We believe he does and that he should have more assistance, a decent and healthy office, and substantial evidence that the services of a capable and honest plumbing inspector are appreciated.

HEALTH DEPARTMENT.
OFFICE OF THE INSPECTOR OF PLUMBING,
WASHINGTON, D.C.

SIR: I have the honor to make the following report of the operations of this office, during the fiscal year ending June 30, 1882, embodying such recommendations and suggestions as, in my opinion, will increase the efficiency of the service:

Five hundred and forty-two permits have been issued for the erection of new dwellings, plans of which have been submitted by the owner, architect or plumber for examination and approval.

Seven hundred and two permits have been given for making connection with the public sewer.

Nine hundred and fifty-six inspections have been made by me of the plumbing work in dwellings, including alterations and changes in the drainage system of old houses.

Not less than three inspections of the plumbing work in every new house is made by me before completion, and sometimes as many as four inspections are made in the case of alterations in old houses. This latter work requires more time and attention than any other part of my duty, as I am frequently called upon for detailed reports.

The fact that our city was the first large American city to adopt intelligent regulations governing plumbing and house drainage, and that we have been met by cordial public support in applying the rules to practice, is a matter for congratulation.

Since August the first, 1881, the time when our regulations went into effect, several cities, notably New York and Brooklyn, have adopted substantially the same forms, with modifications suited to local usage.

In some respects our rules should be revised, especially in respect to drains under dwelling houses. In both Brooklyn and New York, the use of earthen drains is prohibited. Upon this point I have given my views more fully in a communication of ——— to the Department. To require only heavy cast-iron pipe inside of the building line is absolutely necessary in order to avoid soil pollution, and consequent danger to health, and is consistent with approved practice in other cities.

The earthenware drain should end at about five (5) feet outside of the foundation walls of the house; the joint between the iron drain and the earthenware pipe should be made with pure hydraulic cement, and where the iron pipe passes through the wall, a relieving arch should be built over it to prevent the pipe from being broken by the settlement of the walls, which often occurs. Important as it is to have drains outside of the house free from sediment or leakage, it is still more so to have all the pipe joints inside of the house perfectly air and water tight, and to insure this the plumber should always stop the openings and fill the pipe with water, before a notice is sent to this office for an official inspection of his work.

The danger of water pollution by direct connections of water closets with domestic service pipes, is a matter of serious importance, and this practice (which is a common one) should be prohibited.

The practice which was common in former years, of connecting two or more houses with one private drain, is now giving us a large harvest of trouble, which is at present beyond the power of this Department to remedy.

Suitable legislation should be invoked for the abatement of this very serious evil by requiring separate house connections and the total abandonment of these foul and defective sewers. Several aggravated cases, pointing to sickness and death, have come under my notice, but I have had no power to alleviate the trouble, except by voluntary conversions of all interested parties.

There are also a large number of houses which have no sewer connections, but drain into dry wells and cesspools, polluting the soil of the entire vicinity surrounding. These wells were constructed long before the present sewerage system was adopted, and are still in use in localities where connections with public sewers may conveniently be made. Although there is no law to compel property owners to construct sewers in front of their houses, in all cases where there is no appropriation for such work, it is the rule of the Engineers' Department to furnish the material and construct a sewer, upon the payment of one-third the estimated cost by the owners of property benefited.

I earnestly recommend an investigation of all houses not connected with the public sewers, and that active measures be taken to extirpate these foul cesspools and wells.

As parties have objected to the running trap and cold air vent, on the line of the main drain, and in some cases, I am informed, have closed up the latter, imagining that injurious effect would result from having them in front of their houses, it would perhaps be well to say something about the advantages to be derived from these modern appliances, and the reasons for their adoption.

In order to effect a constant movement and change of air in the pipes two openings are required, an outlet and an inlet. The extension of the soil pipe through the roof affords an escape of the foul air generated in the sewer, by the decomposition of foul organic matter clinging to the inner surface of the pipes. In order to render harmless this matter undergoing putrefaction, a constant introduction of pure air from the outside is absolutely necessary, and as the soil pipe is warmer in winter (being in the house) than the fresh air pipe, located near the ground in front, the result is an almost constant upward current in the soil pipe.

This I have found to be the case even with the soil pipe on the outside of the house, for the reason that it is heated more by the sun than the fresh air pipe near the ground.

Most persons are familiar with the running trap, which is practically a bend in the drain, holding a sufficient quantity of water to prevent the passage of air or sewer gas from the street sewer to the house drain. This, in conjunction with the cold air vent, gives perfect security against the public sewer.

The law now requires every new house to be connected with the public sewer, and consequently even a small house is generally fitted up with a kitchen sink, a water closet, and sometimes a bath tub, while in a more expensively built residence, arranged with a more costly system of plumbing, we find, in addition to the above, stationary wash stands, near sleeping apartments, a number of bath and dressing rooms, having in them water closets, urinals, foot tubs, bidets and other fixtures.

The regulations of this department apply, with as much force, to the drainage and plumbing of small houses as they do to the most costly residences. The same protection is given to all, and as these rules have been established for the proper drainage and plumbing of houses, the public may rest assured that, when they are carefully observed and strictly complied with, there can be no danger of escape of sewer gas or foul odors in their dwellings.

* * * * *

It has frequently come within my notice in making inspections of houses already occupied, that owners insist that their plumbing must be all right, as they have paid ruinous plumbers' bills; that they know their sewers are all right, as they made the plumber put in one twice as large as he was going to—the popular idea of a good sewer being in exact proportion to the size thereof.

Owners should inform themselves somewhat as to the proper methods, and require plumbers to explain the purpose of all the pipes used; doubtless, that would sometimes puzzle even the architect. Plumbers are frequently embarrassed by being called upon to examine work done by themselves, within the past few years; instead of frankly condemning it and admitting that, at that time, they were not possessed with the full sum of human knowledge in matters of sanitation, they make the mistake of saying that the work was well done, and do not advise a change. The community must know that plumbing methods of five years ago are quite inadmissable now.

* * * * *

A four-inch house drain, if well graded, will carry off all the rain fall—which is the measure of the largest demand upon it of an ordinary city house and lot. A 6 inch drain will serve the largest house. There are now hundreds of houses in this city having eight and ten-inch drains, and an instance has recently come under my notice, in searching for a cause of death from diphtheria, of a 12-inch sewer run in especially to drain one house, and it is unnecessary to say that the two and seventy stenches of Köln were a sweet smelling savor compared to this abominable stinking thing.

As regards the set fixtures generally used in houses, I have but little to say, as it would require too much space to discuss the merits and demerits of the large number of patented devices now in use; but I must not omit to say that a house fitted up with a pan closet of whatever pattern, in a sanitary point of view, is unsafe, no matter what care has been taken to ventilate the soil and waste pipes. The most offensive part of the pan closet is the receiver or cast iron container under the bowl, for the solids gradually accumulate on its sides; this filth soon undergoes decomposition, and the gases that are confined between the pan and the trap escape into the apartment whenever the closet is used. To remedy all the defects of the pan closet by enameling, ventilating containers, and having special flushing arrangements, would make it more expensive than any of the modern closets now in use. I cannot too strongly condemn the use of pan closets, and hope they will be prohibited in dwellings by an intelligent public sentiment.

Many cases of complaint coming to this office of offensive odors in houses, point directly to the stationary wash tubs in laundries, made of wood, and always found to be a source of impurity. A moment's consideration will convince any one that a vessel which is to be used for laundry purposes should be made of a material which is non-absorbent. The disagreeable odors which arise from the absorption of the dirty, soapy water in the fibre of the wood, and which are always perceptible upon opening the basement doors in the morning, must be deleterious to the health of all in the house. I therefore strongly urge that the use of wooden wash trays and sinks be prohibited.

The less amount of woodwork about set fixtures of any kind the better, and every aid should be given to cleanliness by having them exposed to light and air. This is generally under the control of the architect whose mistakes in planning has been the cause of incurable evils, and much unnecessary trouble to housekeepers in so boxing fixtures as not to admit of frequent and thorough scrubbing. The location of plumbing fixtures in dark corners, under stairways, and in closed closets, should always be avoided.

The 4-inch flat trap now so commonly used in areas, and even in cellars, is one of the filthiest contrivances and vilest deceptions known to the plumbers' trade. It has no merit either as a seal to keep down the foul odors from the sewer, or as a safe exit for the surface water that may fall or run into the area. We as often see the top off as on, and when in place the dip or seal is filled with decomposed vegetable matter or dirt, so that it becomes more offensive and injurious to health than no trap at all. When it becomes necessary to have drainage for areas, I recommend an ordinary S-trap under the ground, with an iron grating over it, so constructed as to carry off freely all drainage or surface water.

I have in answer to calls from householders, and parties wishing to buy or rent houses, made a large number of inspections of dwellings built before the Act of Congress was passed authorizing the appointment of an Inspector of Plumbing. Many of these have been good houses, some among the finest in the city, well built and kept in good repair, yet not one of the number was found free from defects, more or less serious in their plumbing and drainage, and in most of them careful examination revealed most frightful conditions, as is shown by the accompanying drawings. (See next page.)

Drawing marked *A* shows condition of plumbing and drainage in dwelling on I street between 12th and 13th, previous to being remodeled.

Drawing marked *B* shows condition of one of a row of houses on Capitol Hill, showing defective plumbing and drainage and no ventilation. This is a fair representation of the old plumbing work in many of our small dwellings.

"*C*" shows condition of drainage and plumbing in a first-class residence on 17th street, N.W.

"*D*" shows condition of one of a row of houses in the south-east part of the city. No traps to any fixtures in the house, and underground drainage defective.

"*E*." Condition of stationary wash stand as found in first-class dwellings.

"*F*." Pan closet.

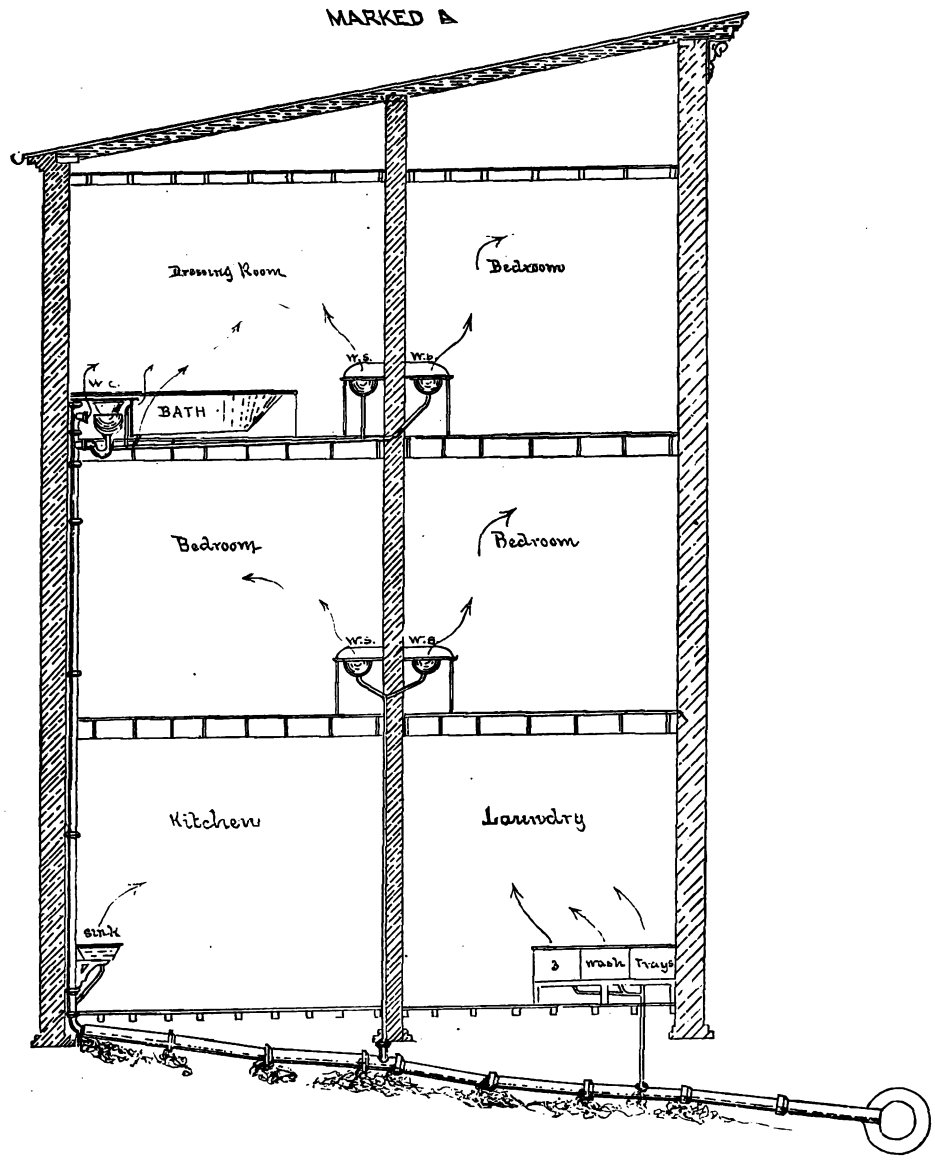
"*G*." Water closet trap with hand hole cover loose, and half off.

"*H*." Defective connection of kitchen sink, showing necessity for brass thimble and plumbers' wiped joint in connecting lead with iron pipe and T branch with ⅛ bend on line of main drain in cellar.

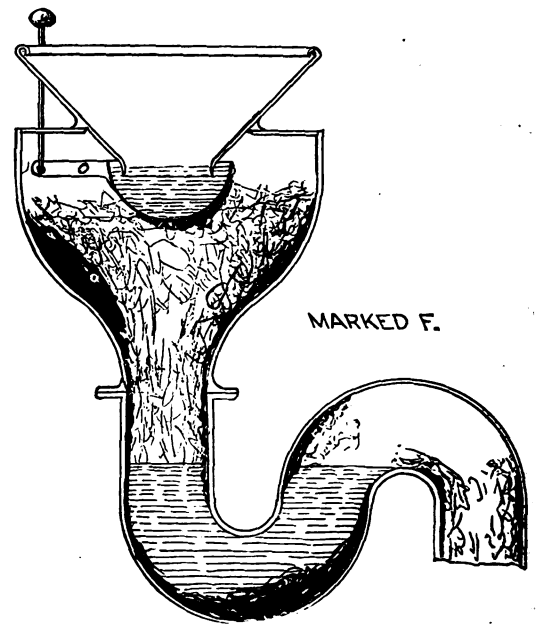
One would suppose that the work was intentionally designed to do as much mischief as possible. If householders would only realize the dangers from such practical examples of stupidity and criminal negligence, there would be such a demand for houses, free from these defects and properly constructed, that owners of property would soon see it was to their interest to expend the sums necessary to secure thorough work done in accordance with the regulations of this department.

Unprincipled plumbers can be found who will run the risk of being taken to police court—they may escape detection, but the householder is the sufferer in being

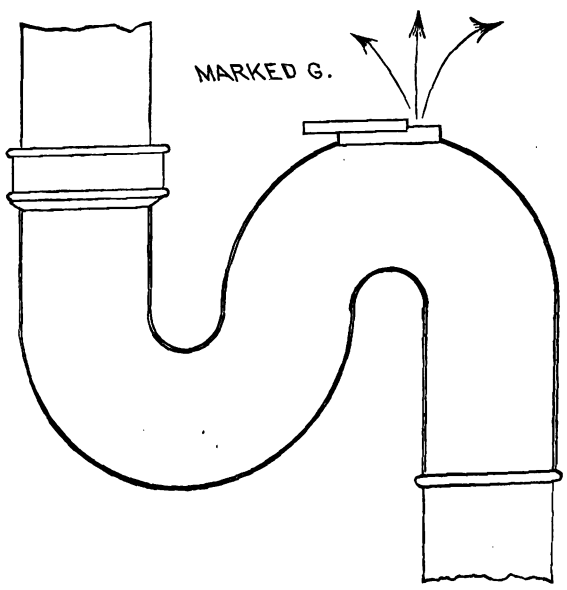
(*Continued on page IV. of Supplement.*)



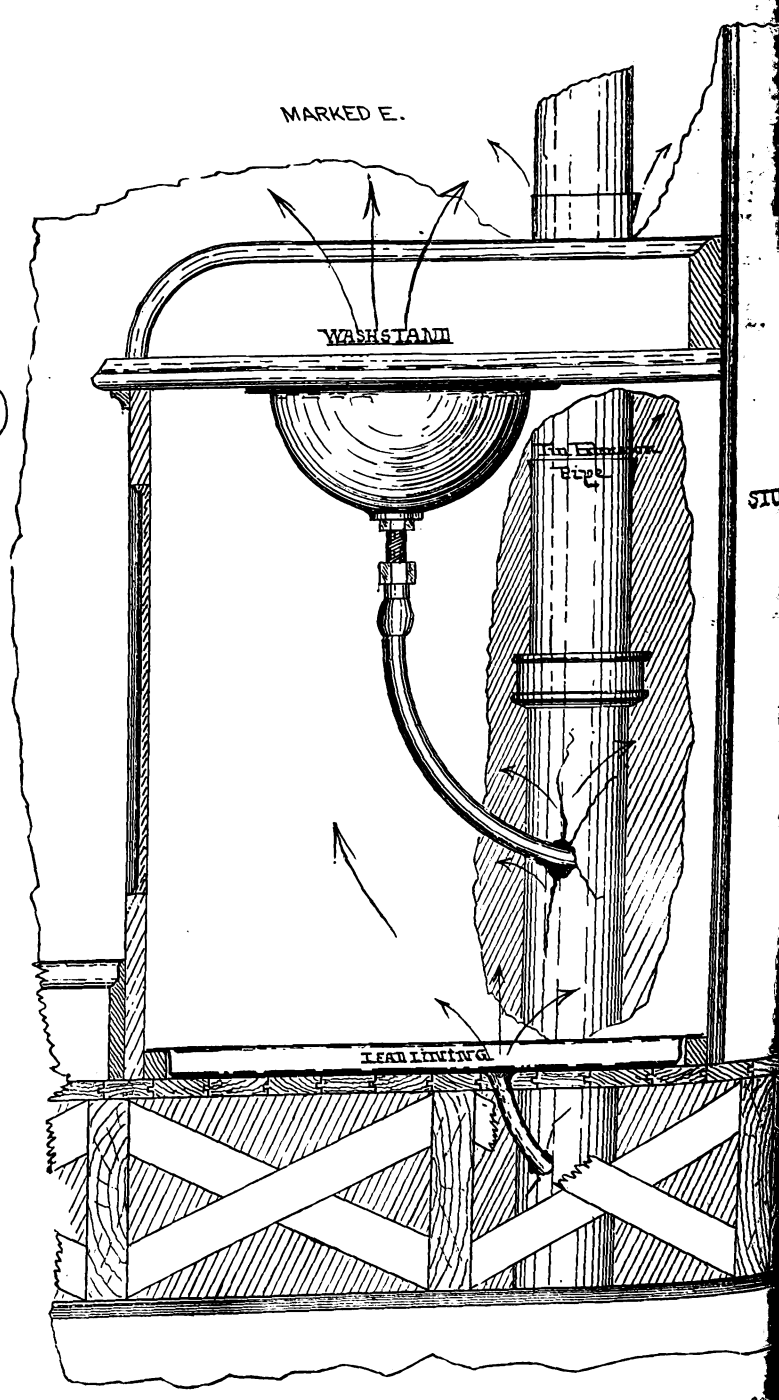
Condition of plumbing and drainage in dwelling on I Street, between 12th and 13th, previous to being remodelled.



A Pan Closet.



Water closet trap with hand hole cover loose, and half off.



Condition of Stationary Wash Stand and Waste Pipe, as found in many fir dwellings.

SPECIMENS OF RASCALLY PLUMBING DISCOVERED BY S. A.

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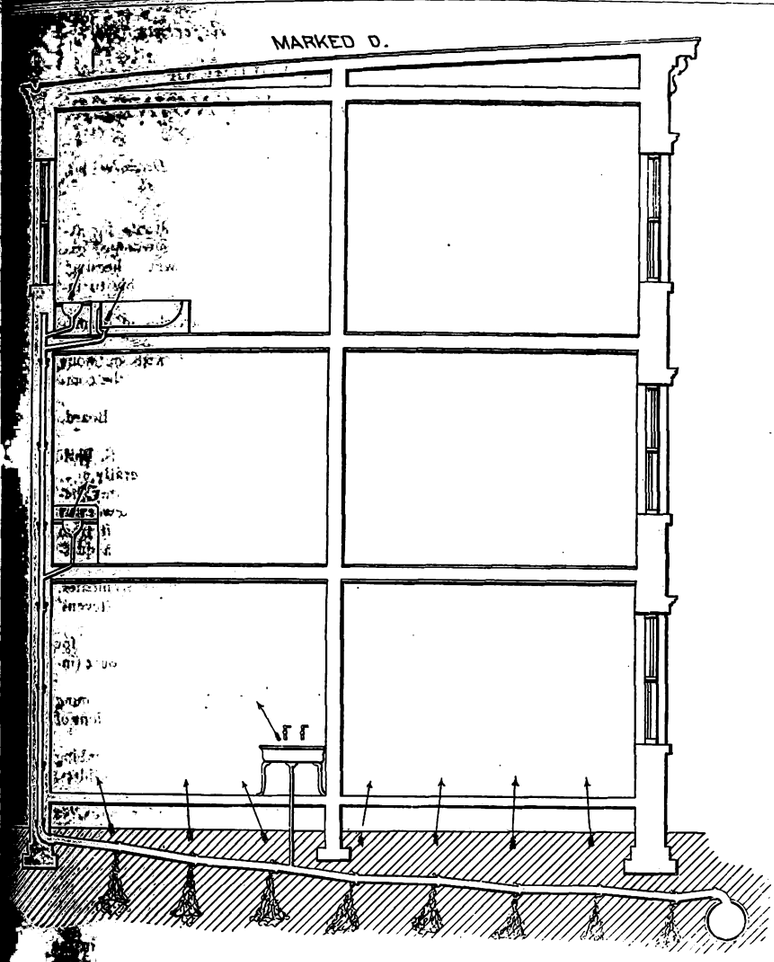
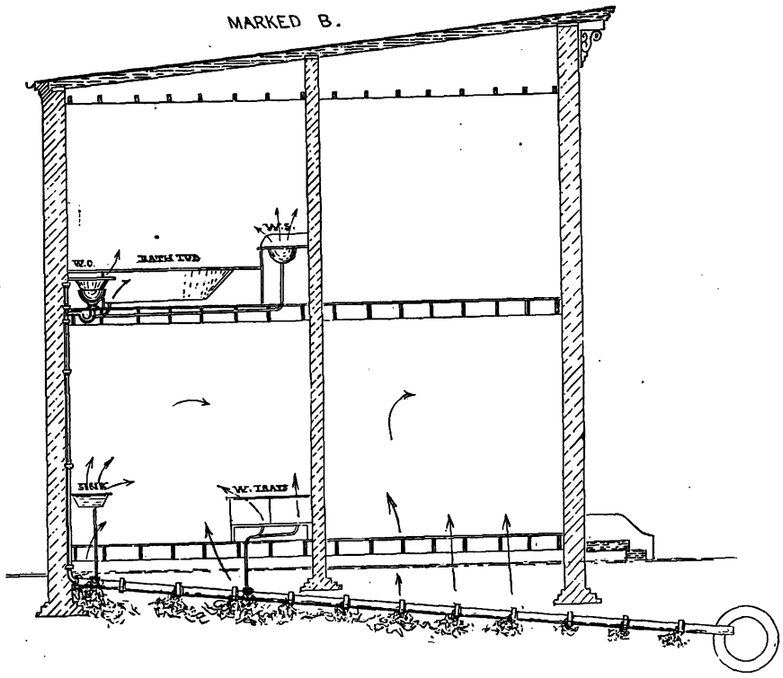
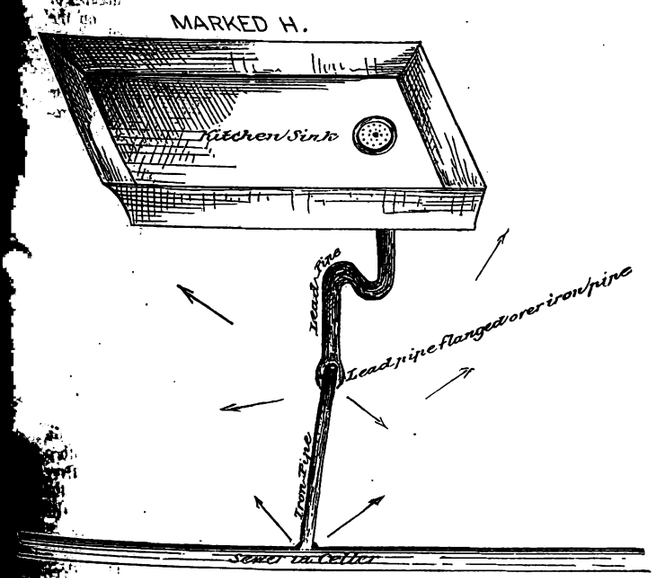


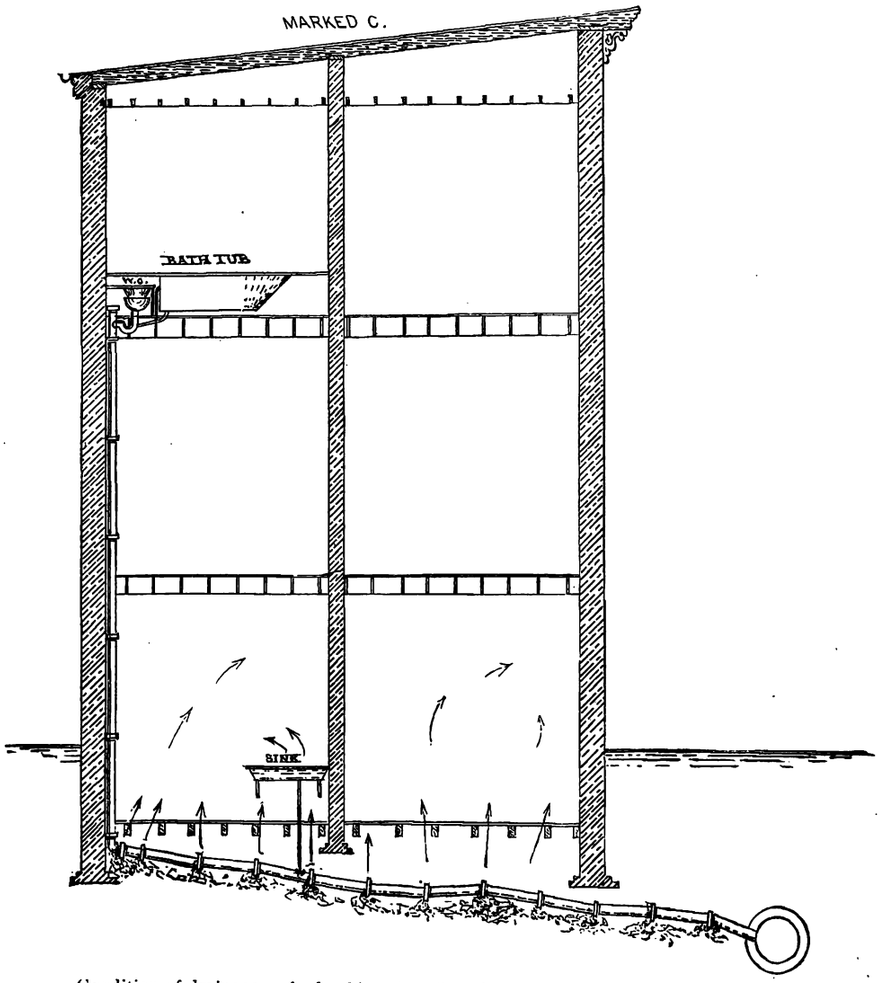
Condition of one of a row of houses in the southeast part of the city, showing no trap to any fixture in the house, and the underground drainage defective.



Condition of one of a row of houses on Capitol Hill, showing defective plumbing and drainage, and no ventilation.



Defective connection of Kitchen Sink; showing necessity for brass thimble and plumbers' wiped joint, in connecting lead with iron pipe, and for Y branch, with one-eighth bend on line of main drain in cellar.



Condition of drainage and plumbing, in a first-class residence on 17th Street, N. W.

ON INSPECTOR OF PLUMBING OF THE DISTRICT OF COLUMBIA.

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subjected to the dangers that arise from bad workmanship and a faulty system of plumbing.

The numerous applications of tenants, owners and prospective purchasers, for inspections of houses already built show an increased interest of the public in all matters pertaining to sanitation. Such inspections usually require detailed reports, frequently embodying recommendations and plans for remodelling, and as my office hours are fully occupied with consultations and inspections of plans, I am compelled to do a large part of my work at night at my own residence. I am frequently called upon at unreasonable hours to investigate some real or imaginary trouble, when more properly the parties should have sent for a plumber who could have charged for service. Yet I do not think it advisable to attach a fee for inspections and examinations from this office, as the Government should offer the fullest opportunity for the detection of danger to the public health. While the Act of Congress authorizing an Inspector of Plumbing did not contemplate such inspections of old houses, yet it is of the highest importance for the protection of the public health, and properly the work of this office, but as I have no assistance, many of these applications must necessarily be neglected.

Two years ago a gentleman called upon me to make an inspection of his house, stating that it was occupied by a member of Congress, who had complained of offensive odors arising from the set fixtures in the house. I made the examination and reported as follows:

"Drainage system defective, and without ventilation either for sewer, soil or waste pipes, and in some cases no traps under fixtures. I recommend that the necessary alterations be made at once, and that the offensive pan closet under stairway in basement, and the stationary wash stands in sleeping apartments be removed. In its present condition the house is unsafe."

As there were no regulations, at that time, governing such work, no attention was paid to my suggestions, and the only work done was to ventilate the soil pipe into the furnace flue. So soon as the tenant moved out of the house, the owner, with his family, consisting of his wife and two children, took possession. To-day those children are at the point of death with a malignant case of typhoid fever.

The father called a few days ago, giving me the information about the condition of his children, and expressing great regret that he had failed to comply with my suggestions of two years ago, begged that I would go with him to the house, and point out what could be done to give temporary relief, until such time as he could have the necessary alterations made.

He confessed that, besides the remorse of conscience, and perhaps the fatal termination of the sickness in his family, the bill for medical attendance, medicine, etc., would be four times what would have been required to put his house in perfect sanitary condition.

While my efforts to enforce the regulations have been kindly received and cordially aided by a majority of the registered plumbers, yet there are those in the business who apparantly take advantage of the great demand on my time, and do their work badly, and run the risk of detection. These men will express their willingness to correct the same when discovered.

Again there are a class of plumbers not bonded and registered, who are encouraged to violate the law, by property owners, who are satisfied to have cheap work done in tenement houses, not caring for the health or comfort of their tenants.

In order to break up these and other bad practices, and to obtain uniform methods for the security of the general health, this office should be reinforced by two or three assistant inspectors, and I respectfully suggest that such appointments be made, at the earliest practicable moment. These assistant inspectors should be young men of good character and address, and appointed upon the unanimous recommendations of a board, consisting of one professional sanitarian, one master plumber, and one journeyman plumber, and the requirements should be practical skill in plumbing, and sufficient knowledge to satisfy the board of their fitness.

I desire to return my thanks to the Honorable Commissioners, and to the officers of the Engineers and Health departments for their hearty support in my efforts to execute the duties of my office, and I trust they will soon take the necessary steps to secure efficient assistant Inspectors, so that the rules may be enforced equally upon all, and that the greatest good may follow the efforts now being made to bring about sanitary reform in the construction of our dwellings.

Very respectfully, Your obedient servant,

SAM'L. A. ROBINSON,
Inspector of Plumbing.

DR. SMITH TOWNSEND, *Health Officer.*

THE ANALYSIS OF AIR, WATER AND SOIL.

A correspondent of *Medical News*, writing from Geneva, Switzerland, about the "Studies in the Berlin Gesundheits-Arut," describes the method adopted for the analyzing of air, water and soil, for the detection of bacteria micrococci and bacilli. A long glass cylinder drawn to a very narrow tube at one end, and covered with a rubber shield at the other, is used. The air from a given locality is drawn through this tube by a pair of bellows. The cylinder rests horizontally; contains a layer of sterilized gelatine mixture, which is poured in hot and solidifies in cooling. When a given quantity of air having been drawn through the tube, the rubber shield is attached to one end, and the other open narrow end is closed by a plug of sterilized cotton. In the course of twenty-four hours the germs begin to show on the surface of the gelatine in the form of the well-known opacities, "vegetable moulds," which first appear in isolated spots. In a day or two the spots coalesce, the gelatine is fluidified, decomposed, and further observation rendered *nil.* But this process is easily retarded by placing the cylinders in an ice-chest. The number of the opacities in the whole cylinder gives of itself a coarse idea of the purity or impurity of the air, and the examination of them under the microscope reveals their precise character.

In the examination of water and soil, the culture substance is poured upon glass slides, where it solidifies. The gelatine is now inoculated with the water on the earth, and a number of the slides are banked up so that each is separate, and the whole bank, containing perhaps twenty slides, each of which has three inoculations, is placed in a moist chamber. In the course of twenty to thirty hours the opacities begin to present flocculi, which gradually increase in size. The "flocculi" are seen under examination by the microscope to be composed of several kinds of micrococci and bacilli, or are commingled with the common vegetable *pilze.* All that is necessary to get a variety pure is to reinoculate from the purest place another set of slides, and thus to finally arrive at the isolation of individual germs.

One of the most important conclusions reached by this means of study, was the discovery of the fact that the upper layers of the soil are always rich in bacteria and bacilli, while micrococci are present in much less degree. With reference to this interesting point, I may as well quote literally from Dr. Koch's report to the Health Office some time ago.

"Samples of soil from very filthy places, for instance, from accumulations of manure, showed an excess of micrococci, with the presence also of the vegetable fungi (schimmel pilze), but this is always only a local phenomenon. On the other hand, the upper layers of cultivated soil (horticulture and agriculture) show constantly and in great quantity the presence of bacilli. Such organisms were found in the soil of the garden of the veterinary school at Berlin just as abundantly as in the earth of a long disused burial ground, or as in samples of soil taken from fields and gardens far removed from inhabited places." Dr. Koch goes on to state that when these samples of earth are allowed to dry, the few micrococci present disappear in the culture substance, but the bacilli remain just as abundantly as before the desiccation. Hence it is concluded that the micrococci soon perish when dry, while the bacilli in the form of spores still remain alive. And this view is confirmed by the fact, as proven by experiments with disinfection by heat, that the germs of bacilli withstand a degree of heat which is fatal to the maturer forms. Dr. Koch considers it probable that these bacilli spores do not spring up in the earth where they are found, but that they are wafted thither from distant products of decomposition, or are carried over in the dust of the air. It was by means of these investigations that the author arrived, also, at the very curious fact that all micro-organisms, however abundant on the surface of the earth, gradually diminish in its depths, so that at the short distance of one metre (40 inches) the earth is almost free. Even in the middle of Berlin samples of earth at the depth of one metre were entirely free from bacteria or bacilli, and showed upon the surface of the gelatine culture substance but very few scattered colonies of the smallest micrococci.

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OUR FUTURE NATIONAL HEALTH ORGANIZATION.

No. IV.

Taking into consideration the present situation of the National Board of Health, and the character and strength of the opposition to it, as explained in our preceding papers on this subject, we come now to consider the future prospects of the board, and what is the best course to pursue.

In the first place, is it wise at the present time to contend for the existence of a National public health bureau? We think it is. Although the creation of the National Board was perhaps premature, the public and Congress not having been educated as to the utility and importance of such a branch of government, we believe that now there is sufficient interest in the matter to induce Congress to give attention to the subject, and there is a fair probability that something will be done. Second, what should be the duties of such a bureau? If the views of skilled sanitarians are to be taken, and the public are sufficiently educated, we have no doubt that the most important duties of such a bureau are indicated in the Act constituting the National Board of Health, viz., to make investigations, collect and publish information, and to give advice. It should be charged with the supervision of a National System of Vital Statistics, with chemical and biological investigations of preventable diseases, with securing, as far as possible, uniformity and efficiency in the methods of State and Municipal health administration, and the advising of all departments of the government in matters pertaining to the public health. This would include the giving of advice and the preparation of rules and regulations with regard to quarantine, whether this is to be administered by National or by local authorities. Whether it should also have executive functions in the management of quarantine appears to us to be a matter of secondary importance. This, however, is not yet the view of the public or of those members and Senators who are most active in endeavoaing to establish a Public Health organization. To them, quarantine seems to be the great and most important consideration, and the other functions of such a bureau to be either of minor importance or positively inexpedient. For example, the Chairman of the Senate Committee on Epidemics, who is the strongest advocate of a National Board, takes the position that the only ground for the existence of such a Board lies in the power of Congress to regulate commerce, and that therefore the only duties which can properly be imposed upon it relate to quarantine. If the Board cannot have quarantine functions he thinks it should not exist. While we are sure that this view is erroneous, it is necessary to take it into account, and if we can only have such an Educational Health Board as we desire, upon condition that it shall have charge of the aiding State and local Boards in their quarantine work, we certainly advise acceptance of the condition.

At the present time the Marine Hospital Service does not command the confidence of State and Municipal health authorities as does the National Board—of this we have fully satisfied ourselves; and the more urgent the Supervising Surgeon-General is to be placed in charge of a National Quarantine, the more suspicious the people are likely to become.

The third question is as to the organization of our National Health Service. Shall it be a Board as at present, or placed in the hands of one man, a Commissioner of Health? Personally we prefer the latter plan as giving more efficiency and fixing responsibility, and this is really the only valid reason for turning the matter over to the Marine Hospital Service. But we know that the general feeling is in favor of a Board which is supposed to represent the various interests of the country, and such a Board we accept. The general plan of the present Board seems to us as good as any other, but in the selection of members we do not think that physicians only should be taken. It seems to us that the Board should contain one or two members selected from the mercantile class. We also think that much more power to act should be conferred by the Board itself upon either its president or secretary than it has heretofore granted. These, however, are matters of detail; the main point is that no additional legislation seems to us necessary so far as the organization of the Board is concerned. There may be no good reason why the execution of whatever the Board may decide upon as regards quarantine should not be carried out by the Marine Hospital Service, nor why Collectors of Customs should not disburse the funds necessary for that purpose, and be paid the usual percentage for so doing; neither are we prepared to assert that such an arrangement is impracticable; we do not know, however, whether this would do away with the hostility of the Treasury Department.

On a former occasion we have expressed our preference for one-man power, and a strong man, too, yet we recognize the danger that the one man may not be sustained in Washington with the many influences to work against him, unless he yields to pressure from politicians, and consents to many things that would not be entertained by an officer such as should be at the head of our National Health Organization. We fear that the present head of the Marine Hospital Service, however sanguine he may be, would not be able to withstand this pressure, and this apprehension, we know, is shared by many whose only desire is to secure the best organization and administration obtainable.

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Of one thing we are satisfied, viz.: that the business men and merchants of this country, are beginning to understand that the uniformity in quarantine regulations, which is so important to their interests, can only be secured by some National Agency; that the National Board of Health has proved itself such an agency, and that Congressmen will find it to their interest to pay attention to this subject, if they wish to retain the confidence of their constituents.

DIPHTHERIA IN PHILADELPHIA.

Diphtheria, since its modern recognition as a specific disease, has continuously appeared in the annual death reports of Philadelphia, varying, it is true, in the number of deaths attributed to it, but still always present. In the year 1861 the mortality from the disease was 502 in a total number of deaths from all causes of 14,468, or in the ratio of 34.69 deaths to each thousand of the general mortality. After this the number of deaths from diphtheria declined so that from 1866 to 1875 the disease was a comparatively unimportant factor in the death rate, causing only from 100 to 200 deaths annually in a population then of about 700,000.

In the latter year (1875), however, the mortality from diphtheria rose to 652, and in the following year (1876) to 708, the highest number reached up to the present year; the 708 deaths occurred in a general mortality of 18,892, which would give a proportion of 37.47 deaths from the specific cause to each 1,000 of the whole number of deaths. In the subsequent years up to 1882, the average yearly number of deaths from diphtheria was about 50 per cent. less.

A writer in the *Medical News* (Nov. 25, 1882) on the "Mortality Statistics of the United States," has deduced from the compendium of the tenth census the ratio of 51.33 deaths per 1,000 of the deaths reported from all causes as the death rate of diphtheria during the year 1880, in the United States. Comparing with this ratio those calculated above for Philadelphia in the two years of the greatest mortality from diphtheria (34.69 and 37.47) it appears that this city has heretofore never suffered very severely from the disease. During the present year the deaths from diphtheria in Philadelphia, up to December 2, 11 months, have been 801 in a total mortality of 18,481, or the ratio of deaths from the disease to those from all causes equals 43.34. This is still below the mortality reported from diphtheria for the whole country in 1880—a year, it may be said, not distinguished by an unusual number of deaths from the disease. However, it is possible that the calculation of the writer in the *Medical News*, comprised under the term diphtheria also the deaths reported as from croup; this would make the comparison less favorable for Philadelphia, but still would not reduce the mortality from diphtheria in the country at large below that of Philadelphia, except perhaps for this year.

The mortality from the disease now reached in the city is not the result of a sudden outbreak, but, following the experience of the past, has been attained rather gradually, as the sequence in the number of deaths during the several months from January, 1881, to November, 1882 (included), will show: 37, 24, 23, 18, 44, 21, 41, 32, 27, 51, 75, 64—84, 55, 48, 41, 66, 55, 55, 53, 95, 112, 137. These deaths have not been specially aggregated in any one section of the city, with the exception of the suburban ward of Frankford, from whence a rather greater proportion of cases of the disease were reported.

To explain why diphtheria is more fatal in Philadelphia this year than before is not easy with the limited data at hand. There has been no unusual congregation of children or others during the year by which the spread of the contagion (always present, as has been shown,) could have been facilitated. "The bicentennial celebration" took place after the mortality had begun to increase. Neither has the weather been such as to cause an unusual number of congested throats with lesions of the mucous membrane into which the poisonous germ might insert itself. It would seem that those occult conditions formerly termed vaguely "epidemic influence," and of which the presence of filth has been shown by sanitarians to be one, have increased the virulence of the diphtheritic poison. No direct evidence has been given that the city is more filthy than in past years, yet as the street cleaning and sewerage have been for some time manifestly unequal to the complete removal of impurities, it is reasonable to suppose that "nurseries" have been developed here and there for the poison in which it has gained its greater strength. Hence the germs have spread by contagion.

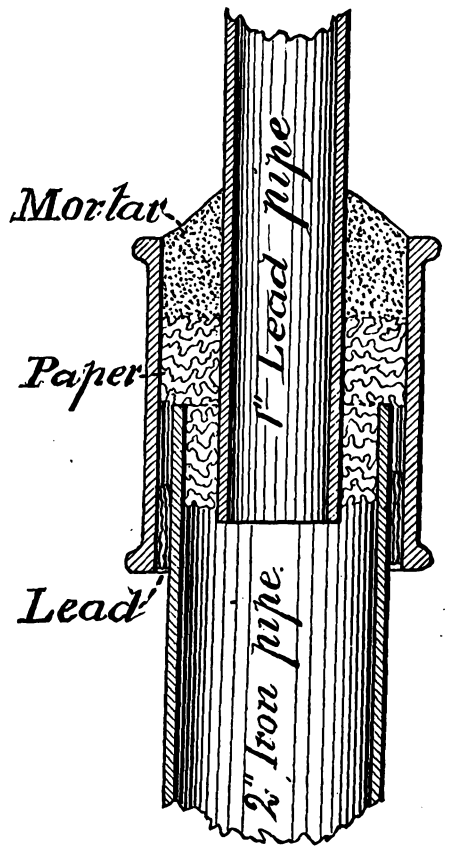
The Board of Health of Philadelphia, at the risk of sensational reports in regard to the severity of the disease, gave wide publicity to the increased mortality from diphtheria, that the inhabitants of the city might be placed on their guard; and had rules printed for the avoidance of the disease to be distributed widely. Especially was the danger arising from the mingling of school children with one affected with diphtheria, or coming from the sick provided against.

A careful study of the course of the disease in the past does not warrant the belief that Philadelphia is on the eve of a severe epidemic of diphtheria; it is more probable that after a moderate advance in the death rate of the disease during December and January, its mortality will show a marked decline.

This is the fourth week that we have to call attention to specimens of dangerous plumbing work in this city, done in flagrant violation of the law and of the regulations of the Board of Health.

In the work described below, John F. Ciotty was the contracting plumber, and one O'Kane the builder of the houses. The owner is stated to be Mary Dugan, but the inspector informs us that he believes Mary Dugan to be an assumed name of the owner.

The following is the report of the examination of the four houses, Nos. 166 to 172 (inclusive)



Alexander avenue, east side, between 135th and 136th streets. No. 164, on the corner of 135th street, belonging to the same lot, was locked up so securely that we failed to get in. It was in this house the Inspector stated he found the worst cases.

"In the cellar of each house the connections between lead waste pipes from the fixtures in the basement with the cast iron pipes leading to the house drain were of mortar or cement. The waste pipes from the wash tubs, from the sink and from the water closet ran separately into the cellar bottom and connected (the Inspector said) with earthenware drains. The 1-inch or 1¼ inch lead wastes entered the hubs of 2-inch iron pipes with no stronger connection than cement. Almost every joint was loosened by a slight pull with the hand. In one case (No. 166) where a large piece had been broken out of the top of the spigot hub, it was easy to see the exact structure of the connection. The lower and greater part of the space between the lead pipe and the iron hub was filled with paper and the top rounded up with mortar as shown below.

"At first the traps on the basement water closet, tub and sink were unventilated. In answer to an order from the Board of Health, the plumber had been putting vent pipes on the traps of the tub and water closet wastes (which are side by side). The water closet traps had evidently been taken out to do this, for one (that in No. 166) had been left (since the day before) with no connection between the trap and soil pipe; *i. e.*, the bottom of the trap just entered the hub of the soil pipe, leaving an annular opening, out of which the air rushed violently when the closet—a hopper—was discharged, as it was once during the examination. The air pipe from the traps in house No. 172 (and presumably to be so arranged in the others, which had not been completed) was carried out through the rear wall and up on the outside of it, ending just below a window.

"On the third floor of house No. 168, the lead vent pipe from the sink and basin traps entered a Y branch on the soil pipe by a defective connection. A piece of iron pipe was used for a ferrule, and the lower part of the space between this and the hub on the Y imperfectly caulked with lead, the upper part being filled with putty, which only was in sight. The waste pipe connection with the soil pipe was of the same sort, but a little better done. The same method was used on the floor below."

Other similar cases have been brought to our notice, and are now being investigated by our representatives; and if the facts warrant, we shall present them to the public in our future issues.

The labor required to verify these cases is such that we cannot conveniently publish more than one a week. We trust it will not require many more exposures to induce the Board of Health to take more vigorous action than they have hitherto done.

PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The action of the State Board of Health in at last beginning prosecutions under the Food and Drug Adulteration Law, passed in May, 1881, has caused quite a flutter in the grocery trade. This law took effect in September of the same year. The following eight months were consumed in making preliminary examinations into the condition of the food and drug market of this State by a number of specialists. Their reports were submitted during March, 1882, at which time we printed a supplement, in which very full abstracts from them were given. The four regular analysts of the Board were appointed at the following quarterly meeting, but did not get fairly to work until after the usual summer vacations. We understand that the Board have evidence of a number of violations of the law, and it is to be hoped that they will now act promptly.

We imagine that a good many men in this city never heard of the New York State Board of Health until the arrests were made, which we elsewhere comment on.

With a view of avoiding any needless embarrassments, we call attention to the suggestion elsewhere made as to the importance of publishing, as speedily as possible, the list of exemptions and standards that the Board are now prepared to allow. If it is to be permitted to sell a mixture of ground gypsum and cream of tartar, it will be interesting to know whether the percentage of gypsum is to be restricted to 37 or 92 per cent.

The sending out of an explanatory circular, as in the case of the illuminating oils law, it seems to us would be desirable.

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The exposures of rascally plumbing that have recently been made in our columns seems to be having a good effect in other cities. Information reaches us that in Boston, San Francisco and Philadelphia the reputable plumbers are taking the lead in securing legislation providing for official supervision of plumbing, and the registration of plumbers.

This city being looked to as a model, we hope our authorities will begin to look after this matter of registration, which of late does not seem to have had the attention it deserves.

Many supposed that the steam seen escaping from the ground in John street during the past week was from breaks in the pipes of the American Steam Heating Company. Their representative, however, informs us that they had no breaks there at the time, but that the steam was caused by Croton water in contact with their steam pipes, which came from a break in the water pipes.

Judging from the report of Dr. W. H. Watkins for the month of October, presented to the Auxiliary Sanitary Association of New Orleans, that city seems to be suffering from a water famine.

"Of 727 premises inspected, but three were supplied with water from hydrants, and six were totally without water supply. Dr. Watkins explains that this means that only six were found without cisterns, but "that scarcity of water is daily becoming more apparent as evidenced by the number of persons availing themselves of the supply in the gutters furnished by the Association pumps." Taking this in connection with a subsequent statement as to "the quite universal practice of throwing refuse matters into the street gutters," and it is evident that impure water must be commonly used in the city. Dr. Watkins also reported that certain keepers of dairies were washing out their cans with filthy water, and cited one instance where such water was mixed in the dough by a baker when preparing the same for bread.

The ignorance of some professional men in matters outside their immediate line of work, though closely related thereto, is well illustrated by the following incident which came to our notice recently.

In the architect's plans for a new church on Madison Avenue in this city when first submitted to the Board of Health for approval a large brick sewer was shown running under the building, and the drainage system connected with it. This seemed remarkable, and the architect was asked about the nature of the ground. He said it was bad, and that they had to excavate 60 feet to secure a good foundation. Then it was evident that the supposed sewer was a ground water drain, put in before the land was filled—probably on a natural water course. Most of it is of loose rubble stone; but at the spot uncovered it happened to be of brick. To this it was evident the architect intended the sewage should go.

As we go to press, we learn that the Board of Health of this city have placed several cases in their attorney's hands for violation of the plumbing law.

The Board of Health, of Boston, were requested some time since to report upon the condition of the Tappan school building, among the children attending which there had been several cases of diphtheria. The Board presented their report to the Aldermen last week, in which they say "the ventilation is poor and some of the rooms badly overcrowded, the children of one room having each less than 70 cubic feet of air in poor ventilation. The vaults and urinals are very offensive, and are situated within about 14 feet of one of the cold air inlets to the building. We cannot say that the cause of these cases of diphtheria is directly attributable to the faults mentioned in the building and its appurtenances, but according to good authority they may have contributed in a degree to the cause, and are decidedly prejudicial to the health of the children. The defective drainage and other unsanitary conditions found in the houses of the children have been and are constantly being looked after by the Board of Health."

THE EDISON SYSTEM OF WIRING BUILDINGS FOR THE INCANDESCENT ELECTRIC LIGHT.

No. I.

In response to inquiries from our subscribers for descriptions of the methods of "wiring" buildings for the electric light, we begin herewith a series of articles on that subject.

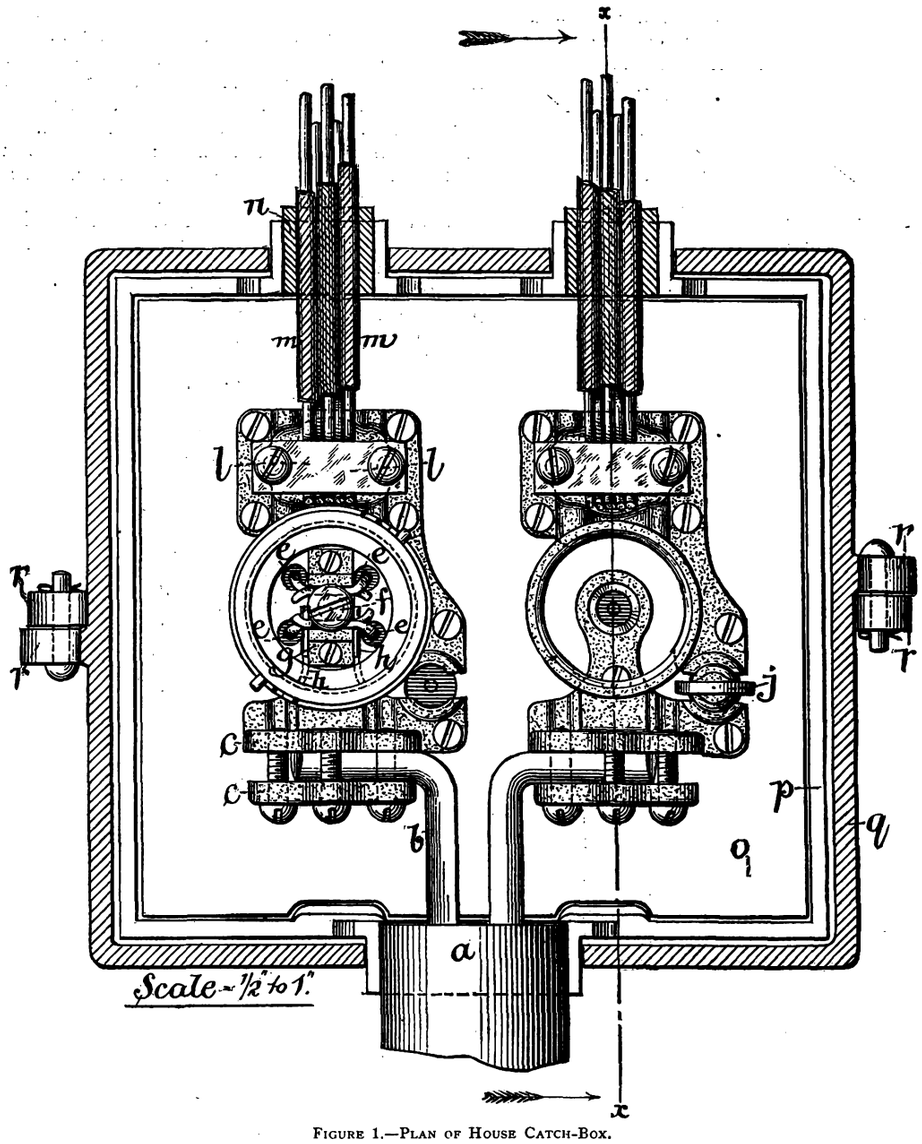

FIGURE 1.—PLAN OF HOUSE CATCH-BOX.

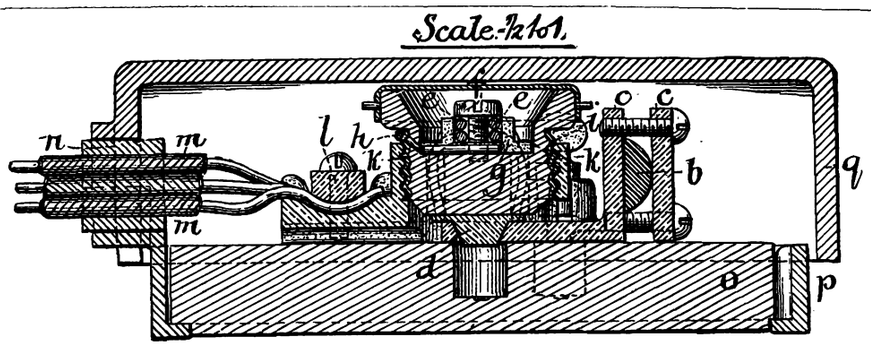

FIGURE 2.—SECTION OF FIGURE 1 THROUGH X X.

The system of the Edison Company as employed in their first district in this city for illumination by the incandescent light from a central station has been chosen for the first number. Similar descriptions of the methods of other companies will follow.

The conductors from the central station through the streets to the houses are carried underground. They consist of copper rods of segmental cross-section, enclosed in iron tubes which are buried about 2 ft. under the pavement near the sidewalk. Each tube contains two rods or conductors—one from each pole of the dynamos—insulated from each other, and from the tube by a non-conducting bituminous substance which fills the space within the tube not occupied by the rods. The conductors are first held in position (their surfaces being at about equal distance from each other and from the tube) by disks of prepared millboard slipped over them before they are put into the tubes. These disks are placed at distances of four to six inches apart, and have holes in them through which the insulating substance in a melted state is forced, to fill the tubes. To do this more thoroughly and leave no vacant spaces, the air is pumped out of one end while the liquid is forced in at the other. These tubes are made in lengths of about 15 feet, and the conductors joined by U-shaped strips of copper (within an iron box filled with the insulating material), to allow for expansion and contraction. The tubes containing the street mains are about 2¼ inches in diameter. A line of this size on each side of

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every street in the district constitute the "net work," which aggregates about fourteen miles in length. "Feeders," in tubes ranging from 2½ to 3½ inches in diameter, run to various street intersections from the central station.

From the mains, branches run to every house to be supplied. For ordinary houses these branch tubes are between ¾-inch and 1¼-inches in diameter, and end a short distance inside the wall in a "house catch-box" shown in Figs. 1 and 2. This consists of a rectangular iron frame *p* holding a wooden base *o* on which are screwed the brass castings, and an iron cover *g* fastened

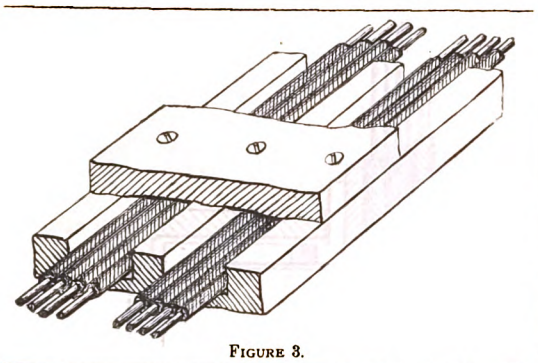

FIGURE 3.

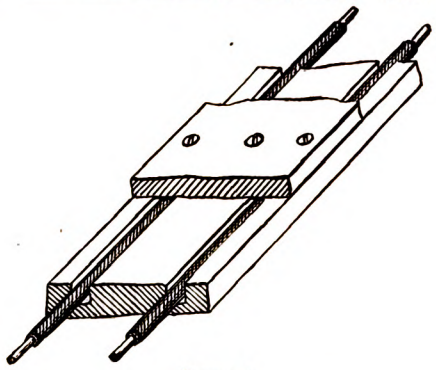

FIGURE 4.

down by the hinges *r r*. The electric tube *a* just enters one end of the box, while the conductors continue beyond its end, are bent at right angles and connected by binding screws with the nearest castings as shown. At this point the circuit may be broken, and the means for making and breaking it correspond to the stop-cock on a gas service pipe, controlling the

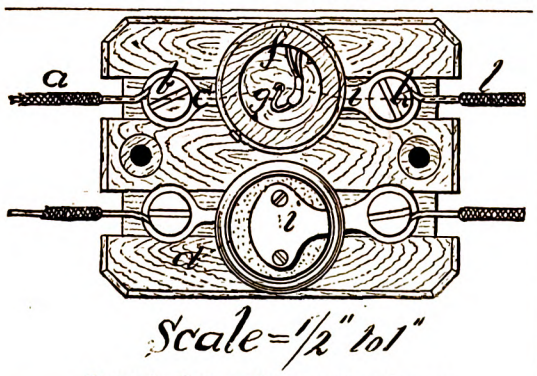

FIGURE 5.—PLAN OF VERTICAL MAIN CUT-OUT.

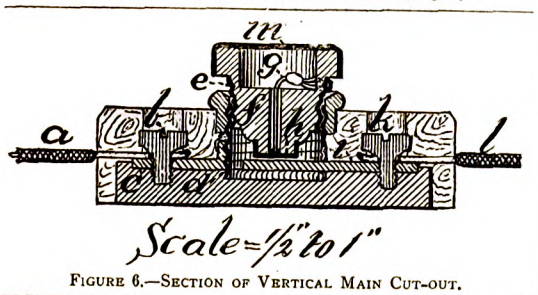

FIGURE 6.—SECTION OF VERTICAL MAIN CUT-OUT.

admission, in the one case of electricity, and in the other of gas, to the fixtures of the house. The first (or lower) casting serves to transmit the current from the conductor *b* through the jaws *c c* to a conical cup (opposite the hinges), the centre of which is directly below that of a hollow cylinder (having screw threads on the inside) which is a part of the other casting under the bar *l*, which binds to it the distributing wires. Connection between the two castings is made through lead wires in a wooden plug having a corrugated copper band on the outside, which fits into the screw threads on the inside of the cylindrical part of the casting. This plug is shown in the section (Fig. 2), and in the left hand plan. Projecting from the bottom of it is a conical brass plug *d* (in the section) which fits into the corresponding cup in the first casting. To this is soldered a number of easily fusible lead wires *e, e*, coming up through the wood, which pass under the screw head *f* and are bound by it to the brass plate *g*, which is connected by wires *h, h*, to the copper band *i*, which makes connection with the casting *k*, and thus out through the wires *m, m*, to the various lamps. The soft wires *e e* melt and break the circuit before the wires get hot enough to burn off their insulation or do other damage; the circuit would then be easily restored by the insertion of a new plug. As the plug is inserted by a slow screw motion, which might make and break the circuit several times before it was fully in place, provision is made for completing the circuit directly between the two castings by a brass plug *j*, which is removed after the permanent "cut out" plug is firmly in place.

After leaving the "house catch-box" the wires pass into the meter, which may be placed in any convenient location. The external appearance of

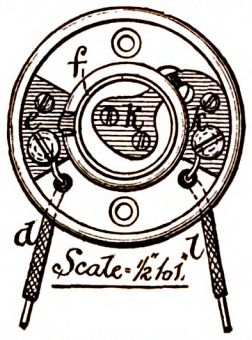

FIGURE 7.—PLAN OF WALL CUT-OUT.

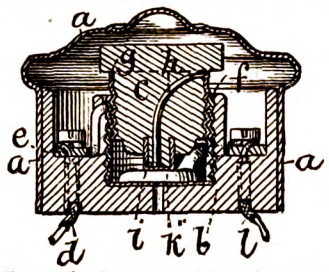

FIGURE 8.—SECTION OF WALL CUT-OUT.

the meter is much like that of a gas meter. It consists of an iron box, the front of which can be removed for inspection, containing in the upper part two electrolytic cells (of amalgamated zinc plates in a zinc sulphate solution) through which a part of the current passes, and in the lower division a lamp to keep the liquid in the cells from freezing. The arrangement for lighting the lamp is automatic, and consists of two strips of different metal (having widely different coefficients of expansion), riveted together, fixed at one end and free at the other. A fall of the temperature inside the meter box sufficient to freeze the liquid in the cells above bends the strip enough to produce a contact between the end of the strip and a pin below which completes a circuit through the lamp until the temperature is raised enough to unbend the strip. The amount of light used is measured by the loss in weight of one zinc produced by transference to the other, which gains an equal amount. The two cells are exactly alike, except that one is short-circuited by a shunt (consisting of a corrugated strip of German silver) having four times the resistance of the similar shunt by which the other is short-circuited, so that the deposit in the first is only one-fourth as great as that in the second, and consequently requires reading only one-fourth as often. The object of the first is to furnish a check on the readings of the second, which should always be in the same proportion as that given by the first. The first is visited once a month by an inspector, who takes away the plates to be weighed, and replaces them with fresh ones, while the second is ordinarily visited only once a quarter.

The distributing wires from the house box are of No. 10 copper (0.134 inch in diameter), covered with a double thickness of braided cotton thread, which, in turn is covered with an incombustible paint, as are all the wires used, of whatever size. They are also enclosed in wooden strips or casings, as shown in Figs. 3 and 4. They are simply thin, narrow boards with grooves for one or more wires and a cover or face-strip fastened on by screws. In new buildings, when the wires are put in while the construction is in progress, they are carried under floors and in partitions. Rough wooden strips are used under floors for main lines and branches to chandeliers, but branches to side lights are in small zinc tubes behind the plaster. The double cotton covered wires are also taped before being inserted in the zinc tubes. Under tile or marble floors, or in other places, to which access is especially difficult, lead pipe is used instead of zinc tubes. In old buildings the wooden strips are fastened to the surface of the walls and ceilings, in sight, and are, accordingly, more finely finished. The number of wires from the house box depends on the number of lamps wanted and the distances to them. A single No. 10 wire will run about thirty 16-candle power lamps as ordinarily arranged in a store a hundred feet deep.

The method of running the wires is similar to that used for gas and water pipes. Vertical mains from the meter are run up through the house and branches taken off for the fixtures on each floor. The horizontal mains under each floor supply the side lights on that floor and the chandeliers in the story below. These floor mains have on them, close to the vertical mains, what are called "vertical main cut-outs" for cutting out each floor without interfering with any other. A plan and section of this cut-out is shown in Figures 5 and 6. It consists of a wooden block to be placed in a pocket in the floor or baseboard, with means similar to that in the house box, for passing both the "in" and "out" current through a lead wire, which will fuse when sufficient heat is developed by any accidental resistance in that line and the current to that floor be thus cut off. The following is the course of the current through the cut-out: from the line wire *a* through the binding screw *b* and the plate *c* beneath it to the copper lining *d* of the plug socket; thence through the corresponding copper band *e* around the plug *f* to a soft lead wire *g*, passing down through the centre of the plug and joining a copper cap *h*, on the bottom of the plug, which rests on a brass plate *i*, to which the screw *k* binds the exit wire *l*. The cut-outs on each wire are exact duplicates, the upper one being represented in the plan as containing the plug in place and the lower one, with it removed. The plug is covered (shown only in the section) by a brass cap, *m*.

In addition to the cut-out for each floor is one for every fixture, placed on the ceiling or wall at the root of the chandelier or bracket. These are covered by a cup or shell, which appears to be only an ornament. This "shell" is sometimes made to slide down or forward on the chandelier rod or wall bracket, to give access to the cut-out (to replace a plug, should one "burn out") and are held in place by set-screws. Such a wall cut-out (for a single bracket) is shown in Figs. 7 and 8. The following is an explanation of the letters: *a*, brass cap covering the circular wooden block *b*; *c*, wooden plug; *d*, entrance wire, fastened by a screw to a brass plate *e*, which is connected by solder to the copper lining *f* of the plug socket; *g*, copper band surrounding the plug, connecting by a soft lead wire *h*, with the cup *i*, resting on the brass plate *k*, to which is bound the exit wire *l*.

In the remaining portion of this article we shall consider the application of the Edison system to the Mills' Building, of this city, where, on account of the extent of the work, there are some modifications of the methods employed for ordinary buildings as described above.

(TO BE CONTINUED.)

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STEAM FITTING AND STEAM HEATING.

BY "THERMUS."

No. XVI.—*Continued.*

DIFFERENTIAL VALVES.

Figures 27, 28 and 29 illustrate the Holly regulating valve and meter, and are here introduced to show what has been done in the endeavor to accurately measure the steam furnished by a supply company to the consumers.

What makes steam so difficult to measure is its variable pressure and the fact that condensation will go on at any pressure. If steam could

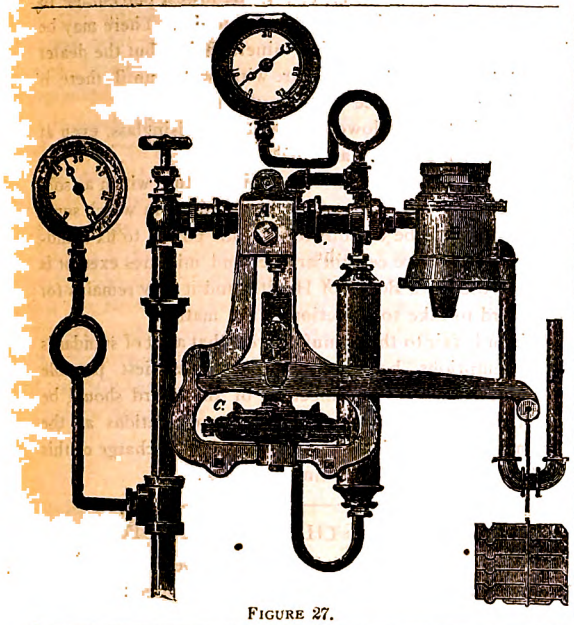

FIGURE 27.

be kept at a constant pressure and condensation arrested, it would be as easily measured as gas, and a price per cubic foot could be established for it, as then a cubic foot would have a constant weight and a constant value.

To make myself comprehensive to those who do not understand the *unit of value in steam*, I will explain that by *weight* only can steam be measured with any reliable accuracy. A pound of coal will convert from 5 to 10 pounds of water into steam, depending on how well the coal is burned. It matters little for warming purposes what the volume of the steam may be (though for power it is desirable that the volume should be small and the tension high). It is the weight evaporated which must be taken into consideration, and which will establish its commercial value or selling price. After it is steam it has a thermal value, and this latter quality, unlike most other salable commodities, is of but *one* quality, a pound of steam having very nearly the same heating properties whether the pressure is one pound per square inch and with a bulk of 1,600 cubic feet, or 50 pounds per square inch with a bulk of 440 cubic feet. But should steam be sold by the cubic foot at 50 pounds per square inch, it will have three times the thermal value a cubic foot as five pounds will have, and consequently should have three times the commercial value. Thus the prime condition necessary to measure steam by volume is to have the pressure constant.

To do this the regulating valve *A* is used in connection with the current meter *B*. The valve is a common slide valve operated by the diaphragm *C*. Steam enters from the street through the pipe *D*, say at 50 pounds pressure more or less, and passes unreduced to the valve *A*, through which it flows until it exerts a pressure in the pipe *E*, the meter *B*, and the house pipe *F*, sufficient to overcome the weights on the lever of the diaphragm, when the latter will inflate and close the valve *A* until the passage is barely sufficient to maintain the standard pressure required on the house side of the regulator.

The steam, after leaving the regulating valve, reaches the meter *B* (shown in detail in Figs. 28 and 29) at a reduced and practically constant pressure, through which it passes with a variable velocity, consequent to the requirements of the heating surface or engine.

Fig. 28 is a vertical section through meter and Fig. 29 is a horizontal section on the line *k*. The steam enters through the pipe *B*, which is square and fitted with a metal tongue, *t*, the lower and free end of which rises and falls as the quantity of steam varies. It will be noticed there are two sets of fans, *f* and *G*. The steam strikes the upper fans, *f*, causing the shaft *b* to revolve and communicate its motion to the dial at the top of the meter. The lower fans, *G*, act as a governor. They run in the lower chamber, which is filled with the condensed water, to keep a steady and uniform resistance on the upper fans, which otherwise would be likely to race and require an index with a greatly increased train of wheels.

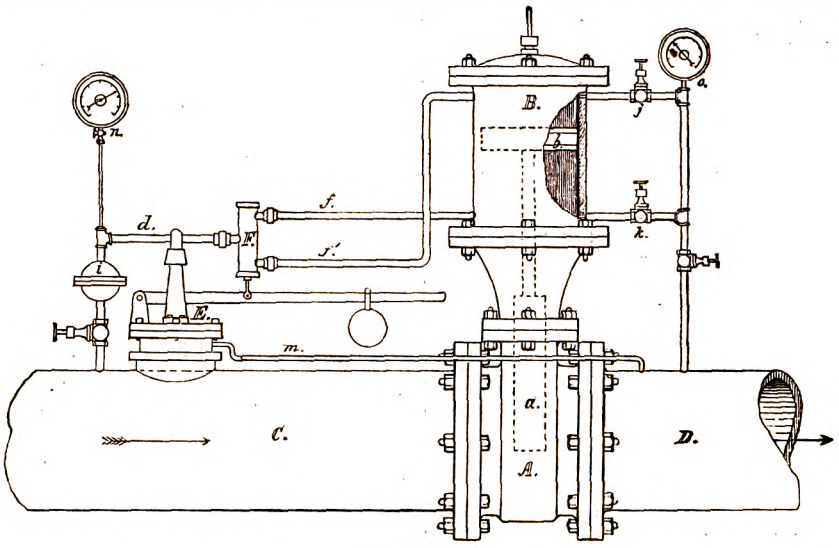

FIGURE 30.

FIGURE 28.

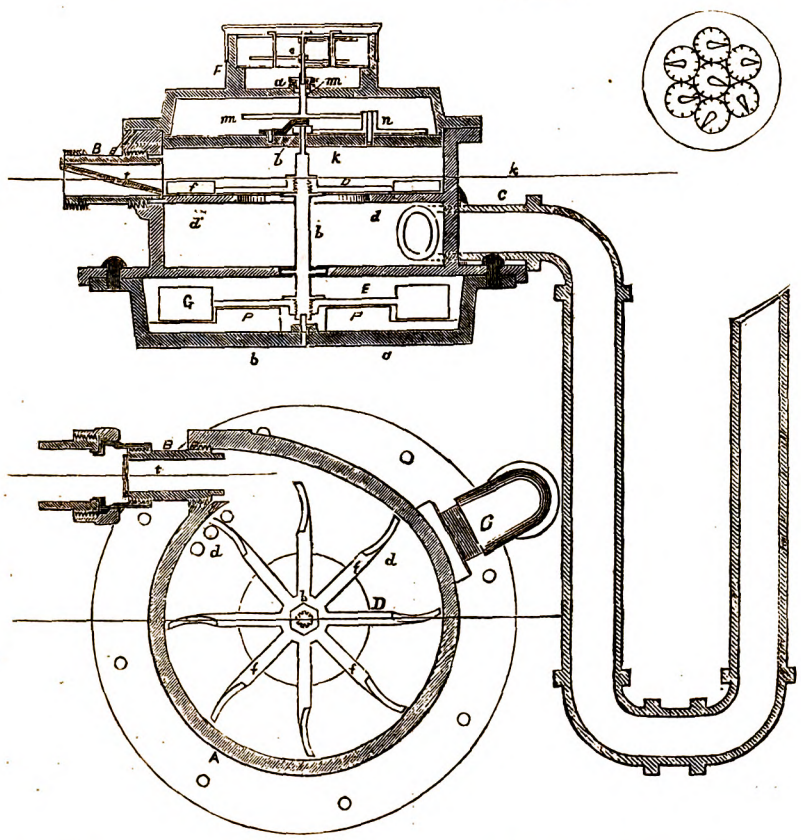

FIGURE 29.

I must not be understood as conveying the idea that this meter measures volumes as a wet or dry gas meter; it does not, it simply records linear measure, as an anemometer or any other current meter, and may be made approximately correct by comparative tests from which a unit may be formulated to agree with the index.

The question has been asked, "If steam cannot be successfully weighed when entering a building, cannot an apparatus be constructed to weigh or measure the condensed water as it leaves the building?" The reply to which has been, "Yes, if we know exactly how much water was carried mechanically into the building with the steam and the steam was used for heating purposes only." But so long as this is an unknown quantity and likely to vary very much with the changes in the weather, and as nearly all buildings run pumps or engines wasting steam to atmosphere, it cannot be done this way.

The question of water carried from the mains may also be a source of uncertainty with the current-meter, but withal there are good grounds for supposing a more just conception can be formed of the quantity of steam passed to a building by the aid of this simple wheel than by any arbitrary unit for the time used, founded on the heating surface within a building or on its glass and wall surface, and the limited data at present at the command of the steam engineer when we also take into consideration defective apparatus and leaky and neglected traps; last mentioned of which have been known to make a difference as great as 25% when put in order.

The Locke automatic pressure regulator for street mains (Fig. 30, though not properly belonging to the subject) is introduced to give another instance of the use of the diaphragm, and how, though exerting a small force itself, it can be made to govern powerful engines, and in the

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hands of one who knows its value its uses are manifold.

In the illustration the pipe *C* leads from the reservoir and it has a pressure too great to be admitted into the distributing pipe *D*, and as the consumption of water from the latter pipe is irregular, a reduced passage or a *set* valve is not sufficient to keep a constant pressure within it.

In this case the gate *a* of the valve *A*, is regularly and automatically moved on its seat, though it is unbalanced; the pressure in the pipe *C* being much greater than in the pipe *D*. To the head of the sliding disk *a* is attached a piston rod and piston *b* which work in the cylinder *B*. The full force of the water in the pipe *C* passes through the strainer *i* and pipe *d* to the slide valve *F* (the connection of the pipe *d* to the top of the diaphragm *E* being only for steadying). The reduced force of the water in the pipe *D* also passes through the little pipe *m* to the diaphragm *E*, the lever of which operates the slide valve *F*. When the pressure in the pipe *D* falls below what the weight on the lever of the diaphragm is set for, the latter subsides and opens the passage in the valve *F* between the pipe *d* and the pipe *f* admitting the full force of the water to the under side of the piston, forcing it upwards and drawing the gate with it when more water will be admitted to the pipe *D*. When the pressure in the pipe *D* increases, it will again inflate the diaphragm, this time opening the passage on the valve *F* between the pipe *d* and the pipe *f*, allowing the force of the water to pass to the top side of the piston and force the gate downward, reducing the supply. The pipes *j* and *k* connect each end of the cylinder with the low pressure side of the valve and act as exhaust pipes for the water after it has been used. These pipes also act the part of a governor over the velocity if the movement at the cocks in each is reduced so as to allow the water to pass out much more slowly than it would flow in through the pipe *d* and *f* and f^1, thereby always maintaining sufficient difference of pressure in the end at which the water is flowing in to force the piston to the other end, though both the exhaust pipes are open.

[TO BE CONTINUED.]

MASTER PLUMBERS' ENTERTAINMENT.

The second in the course of entertainments given by the Master Plumbers' Association of this city at Steinway Hall, took place on Tuesday evening of last week, and was a great success. The hall was well filled with an appreciative audience. A pleasing feature of the entertainment, which consisted mostly of music, was the singing of the Misses Conron, daughters of the veteran plumber, Mr. George Conron, of this city. The proceeds netted about $1,000. The next entertainment in the course will be a lecture by the Rev. William Lloyd on "The Almighty Dollar," which is put down for Jan. 9.

Examinations for granting certificates on Sanitary Science will be hereafter held quarterly, under direction of the College of Physicians of Ireland. The following subjects will be included in the papers:—1. Engineering, including hospital and house construction, sewage, drainage, ventilation, and water supply. 2. Law; the Acts relating to Public Health; duties of health officers. 3. Etiology and prevention of disease; epidemiology, contagion, infection, hereditary influence, accommodation and conveyance of the sick and the management of hospitals. 4. Chemistry; air, water, and food. 5. Meteorology and climatology; vital statistics.

A deputation of physicians and members of Health Boards in various parts of the Dominion of Canada assembled at Ottawa last week to prepare a memorial to the Government on Sanitary Legislation. They ask that a Bureau of Vital Statistics be established at Ottawa in connection with one of the Public Departments.

We have received a copy of the *Asbury Park Journal* containing instructions of the local board of health on care of privies, removal of garbage, etc., which seem to indicate that the parties interested in making this a favorite place of resort are not forgetting the importance its sanitary condition will have in the success of their efforts.

Food and Drugs.

PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The State Board of Health have commenced prosecutions under the Adulteration Law by causing the arrest of the following persons in this city for selling cream of tartar which was adulterated with ground gypsum.

P. H. Peterson, 765 Second avenue; Henry Fulle, 823 Second avenue; Martin Lahm, 922 Second avenue; Mathew Kelly, 851 Tenth avenue; F. Diedrichs, 499 West 57th street; Henry Seekamp, 982 Second avenue; S. Steiermann, 926 Second avenue; H. Goldberger, 983 Second avenue; C. Sinnigen, 1002 Second avenue; D. F. Deike, 880 Tenth avenue.

The complaints were made by Mr. A. L. Colby as inspector, and Dr. E. G. Love, as analyst for the Board.

The accused pleaded not guilty, but were held in $100 bail each, for trial at the Court of Special Sessions.

The adulteration in the above cases amounted to from 37 per cent. to 92 per cent. of terra alba or ground gypsum. In every case the accused stated that the substance had been purchased for pure cream of tartar, and he did not know that it was adulterated, which statement was doubtless true. The price paid for the samples was that of the pure article, and if in the trial it appears that the dealers paid a correspondingly high price to the wholesale dealers or manufacturers, the fraud will be placed upon the latter class, where we suspect it properly belongs.

So far as the enforcement of the law is concerned the retail dealer must be held responsible for the quality of the goods he sells, and he in turn must protect himself by obtaining proper guarantees from the wholesale dealer as to the purity of the goods he may buy. It is a part of the business of wary tradesmen to know what he is selling, and the excuse that he "thought it was pure" cannot protect him in the eye of the law. At the same time he cannot be expected to have every suspected article analyzed to ascertain its purity. For this he must rely upon the guarantee of the manufacturer.

In the cases already brought by the Board the dealers must, therefore, pay the fine if convicted, and then commence proceedings against the wholesale dealer to recover the amount. Doubtless a test case will be selected and if it goes against the dealers the accused will pay the fine without trial. In possible proceedings against the manufacturers it will hardly be necessary for the retail grocers to prove that they asked for pure cream of tartar. A mixture of ground gypsum with tartaric acid does not constitute cream of tartar, and so long as the grocer did not ask for the cheaper substitute there would seem to be no difficulty in holding the manufacturer responsible. Had the manufacturer sold it as a mixture of ground gypsum and tartaric acid, and the grocer in his turn stated to the purchaser that it was not cream of tartar, but a cheaper and inferior substitute, the question would be different.

The plea would possibly be raised that the public demanded a cheaper article, and that some substitute was necessary. This is an old dodge on the part both of wholesale and retail dealers, and yet it would be found wanting as any protection against prosecution for violation of the law. This excuse has probably been urged more in the case of spices than anything else. We are told that the public do not want pure spices; that they are too strong, etc. Of course, if the purchaser wants his mustard with 90 per cent. of flour, and his pepper with 20 per cent. of sand, well and good, that is one question, but it is quite another when we consider the right of the dealer to sell these articles with the understanding, expressed or implied, that they are pure. When a man buys butter, mustard, pepper or other substance he is warranted in supposing that he is getting the genuine article unless informed to the contrary.

As a matter of fact the consumer has become so accustomed to the use of cheap substitutes that he finds the pure articles "too strong," as in the case of pepper. He has not had occasion to learn that if he used a pure article a much smaller quantity would suffice. If the public demand a mustard containing fifty per cent. of flour, there is no objection to the manufacturer supplying the demand, provided he clearly states on his label just what the substance is. The trouble is that these inferior substitutes are sold as pure articles and at the price of the pure articles. We suspect that if the average purchaser was told that a certain sample of pepper was half cocoa-nut shells he would not buy it, and the same can be said of other articles of food.

There are a number of food products which are frequently reduced in value by the admixture of some foreign matter, and which call for the establishment of some standards by the Board of Health.

The addition of flour to mustard is clearly forbidden by the law, and any one selling such an article without stating the nature of the mixture is liable to prosecution. At the same time, if the Board see fit to limit the percentage of flour, which may be added to mustard, and we see no reason for not doing so—the sooner such a standard is fixed the better for dealers and the simpler will be made the question of prosecution.

In the case of vinegar, what is the lowest percentage of acetic acid which this article shall contain? There may be little or no adulteration with mineral acids, but the dealer can "let down" the vinegar with water until there is scarcely any semblance of vinegar left.

Is gelatin to be allowed to be sold for isinglass, even at the price of the former article?

There are other articles of a similar nature which as sold at present are violations of the law, and yet in which some standard should be established. This power to fix standards and to declare certain articles and mixtures exempt is given to the State Board of Health, and it only remains for the Board to take some action in the matter.

It is only fair to the manufacturers that a list of standards and exemptions be published at the earliest possible moment, and a special meeting of the Board should be called to take action on such recommendations as the chairman of the Sanitary Committee who has charge of this matter is prepared at this time to make.

THE ACIDS OF THE PHARMACOPŒIA.

In order to show what changes have been made in this important class the following table is appended:

	U. S. P., 1880.		U. S. P., 1870.	
	Specific Gravity.	*% Real Acid.*	*Specific Gravity.*	*% Real Acid.*
Acid Acetic	1.048	36.0	1.047	36.0
" " Dilute	1.0083	6.0	1.006	4.5
" " Glacial	1.056–58	99.0	.....	.....
" Arsenious	Solid.	97.0	Solid.	100.0
" Benzoic	"	100.0	Prep'd from Benzoin	
" Boric	"	.....	.....	.....
" Carbolic	"	.....	Solid.	.....
" " Crude	Liquid.	.....	Liquid	.....
" Chromic	Solid.	.....	Solid.	.....
" Citric	"	100.0	"	100.0
" Gallic	.....	.....	Prep'd from Nutgalls	
" Hydrobromic Dilute	1.077	10.0	.....	.....
" Hydrochloric	1.160	31.9	1.160	31.9
" " Dilute	1.049	10.0	1.038	7.8
" Hydrocyanic Dilute	.....	2.0	.....	2.0
" Lactic	1.212	75.0	1.212	75.0
" Nitric	1 420	69.4	1.420	69.4
" " Dilute	1 059	10.0	1.068	11.6
" Nitrohydrochloric	.....	.....	.....	.....
" " Dilute	.....	.....	.....	.....
" Oleic	0.800–0.810	.....	.....	.....
" Oxalic	Dropped.	.....	.....	.....
" Phosphoric	1 347	50.0	.....	.....
" " Dilute	1.057	10.0	1.056	9.8
" " Glacial	.....Dropped.....		.....Solid.....	
" Salicylic	Solid.	100.0	.....	.....
" Sulphuric	1.840	96.0	1.843	100.0
" " Dilute	1.067	9.6–10.0	1.082	11.8
" Sulphurous	1.022	3.5	1.035	6.5
" Tannic	Solid.	.....	Prep'd from Nutgalls	
" Tartaric	"	100.0	Solid.	100.0
" Valerianic	.....Dropped....		0.935	

Three acids official in the old Pharmacopœia have been dismissed, viz.: oxalic, phosphoric glacial, and valerianic; the first and last because not much used medicinally, and phosphoric glacial, because almost invariably adulterated with sodium metaphosphate.

Six acids have been introduced into this edition:

1. *Glacial Acetic Acid*, containing 99% real acetic acid, was needed for the preparation of solution of Acetate of Iron. Ordinary 36% acetic acid contains too much water, and cannot be used in this preparation.

2. *Boric Acid*, or *Boracic Acid*, is rapidly coming into use an an antiseptic; it was introduced on this account.

3. *Dilute Hydrobromic Acid* has been much used for several years in place of alkaline bromides. Several ten per cent. acids have been sold in the trade, known as "Fothergill's strength," or "Wade's Acid," etc.; but often these have contained objectionable amounts of impurities. This acid is intended to do away with these unsatisfactory acids.

4. *Oleic Acid.* The satisfactory results attending the external use of metallic and alkaloidal oleates during the past one or two years necessitated the introduction of oleic acid.

5. *Phosphoric Acid.* A concentrated "syrupy" acid is much used for the preparation of syrups containing acid phosphates, and the trade has usually been supplied with an acid containing from 60 to 65 per cent. of real acid.

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But also 50 per cent. acid, used in proportional amounts, answers as well, and is better adapted for preparation of the diluted acid by the addition of water.

6. *Salicylic Acid.* This acid has sprung into notice and has been shown a most valuable medicine and antiseptic entirely within the past ten years. The amount now used medicinally, and as a preservative agent, is very large and constantly increasing.

The most important changes in strength have been made in the case of the following acids:

Acetic Dilute.....	Now	6.0%	Formerly	4.5%
Hydrochloric Dilute...	"	10.0%	"	7.8%
Nitric Dilute.....	"	10.0%	"	11.6%
Sulphuric Dilute.....	"	10.0%	"	11.8%
Sulphurous.....	"	3.5%	"	6.5%

By inspection it appears that the principal diluted mineral acids have been made uniformly 10 per cent. of real acid. As these acids are administered in small doses largely diluted, these changes of strength will not be dangerous or inconvenient, and doses need not be materially changed.

It is practically impossible to make water absorb and retain, at ordinary temperatures, 6.5 per cent. of sulphurous acid gas (SO_2), and even to prepare a solution containing only 3.5 per cent., as is now required, necessitates great care and thorough refrigeration. At 15°C. we find that 3.5 to 3.0 per cent. is about all that water will readily absorb. The present standard is certainly high enough, and it may be wise to lower it slightly in the next revision.

There are other minor points that might be mentioned in this connection, but a careful study of the descriptions and tests will best bring them to view.

Notes.

Distilled extract of witch hazel is chiefly produced in various parts of Massachusetts, Connecticut and New York.

The farmers sell to the distillers the small twigs, preferably in the fall, when the leaves are off. Some of the stills used hold a ton or more of these twigs, together with water enough to cover them. Steam heat is used in distilling, and the strong smelling distillate is the desired product. The amount distilled from a ton of twigs is from 50 to 80 gallons of first-class distillate, but more is sometimes produced of less strength. The composition of the volatile substances thus obtained has not yet been determined. In order to prevent deterioration, it is usual to add from five to ten per cent. of alcohol to the distillate, which is then sold in barrels to wholesale dealers, who put it up in smaller packages to accommodate the retail trade.

After the distillation, there remains in the retorts a dark-colored, very astringent liquid, which, as yet, has not been put to any important uses. It is reported that this has been used as a source of tannic acid; if not of value in this way it may possibly be of use for tanning leather.

The distilled extract of witch hazel should not be confounded with the fluid extract of the *Pharmacopœia*, which is made not from the twigs but from the leaves.

New Method for the Direct Determination of Chlorine in Presence of Bromine and Iodine, and of Bromine in Presence of Iodine.—Vortmann showed a short time ago that, in the presence of small quantities of free acetic acid, chlorides are decomposed neither by lead dioxide nor by manganese dioxide; on the other hand, lead dioxide decomposes bromides and iodides, and manganese dioxide only decomposes iodides, bromine or iodine separating out in the free state. Under certain conditions, of which sufficient dilution of the acetic acid is the most important, this property can be used for the quantitative determination of chlorine in the presence of bromine and iodine and of bromine in presence of iodine. The results are perfectly satisfactory when the chlorides are in excess; with small quantities of chloride in the presence of much bromide, the results are less satisfactory; the quantity of iodide has no effect on the result. —*Journal of the Society of Chemical Industry.—Chem. and Drug.*, Oct. 14, 1882.

Oil of wintergreen and oil of sweet birch are prepared by distillation in various regions in the Blue Mountains. The two oils are almost identical in composition and physical properties, and very much which is labeled as oil of wintergreen is probably oil of sweet birch.

The apparatus used is simple and inexpensive, and a day's produce, for two men, is said to be from one to two pounds, worth about two dollars per pound.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Dec. 9.....	24.09	19.05	21.32	25.86	30.12	19.71

E. G. LOVE, Ph.D., *Gas Examiner.*

SECONDARY BATTERIES.

The so-called "storage" batteries have never offered a very encouraging field for investors, and just now the affairs of the English company, which was formed to operate the Faure patent, are such as quite to discourage those who placed money in the concern in the hope of seeing it both a scientific and a financial success.

As we have already had occasion to remark, there appears to be no good ground for claiming that the secondary battery will ever play any conspicuous part in electric lighting. Doubtless there are special cases, in which cost is of minor importance, where the battery will be found of great use; but these cases will never make the success of the enterprise. The public have yet to learn to what extent the systems of incandescent electric lighting can be considered as profitable investments, and this too, when the electric current is supplied to the lamps direct from dynamo machines. Place a secondary battery, which necessarily involves a loss of energy between the electric machine and the lamp, and the probability of dividends becomes even more remote.

When a roll of lead was "charged with electricity" in Paris and sent to Glasgow, and Professor Thomson wrote his letter of approval, the public naturally supposed that before long the "boxes of electricity" would form a most important feature in electric lighting. Unfortunately such has not proved the case.

The control of the Faure patent seems to be in the hands of one M. Philippart, who, if the reports be true, is a notorious speculator; and on this point recent events show there can be little doubt.

Something over a year ago an English company was formed for the ostensible purpose of manufacturing and selling the Faure batteries. M. Philippart has a controlling interest in this company, and the announcement is just made that a change of policy has been ordered. The English Company instead of continuing the manufacture of the accumulators is now to become a stock-jobbing concern. Licenses are to be sold to smaller companies, and a revenue made out of the pockets of unsuspecting persons instead of by the more business-like plan of making and selling the batteries.

The London *Engineer* has gone into the question with much thoroughness and makes some very plain statements which are not likely to advance M. Philippart's interests very rapidly. A recent number of the *Journal of Gas Lighting* reviews and supports the statements of the *Engineer*.

It appears that the Chairman of the Company and the Board of Directors are opposed to the change of front, but the only course left them is to submit. As to the reason for this change the *Journal* says:—"Applying the common principles of trade to the circumstances, as they have been laid before the public, it does not require powers of deep perception, or a mind warped by prejudice, to conclude that the main reason for this change is that the old work of the Company did not pay, and has consequently been abandoned for a movement which is expected at least to recoup the shareholders for some of their sunken capital." This seems to be the only natural conclusion to be drawn from the action of the company, and doubtless in the immediate future more will be heard of the Faure accumulators as a speculation than as a genuine business enterprise.

It may be well to repeat here what we have already mentioned that there is no storage of electricity in the secondary batteries as we understand the storage of gas in a gas holder. In the charging of the batteries a certain chemical change is effected in the leaden plates of which they are composed. By afterward connecting the two poles of the battery a current of electricity is obtained, and the plates assume their natural condition. According to *Engineer*, all the experiments with these batteries "have taught the same lesson—namely, that the battery is not trustworthy, save in the most experienced hands, and that even when used with great care it is liable to go to pieces and to prove worthless just when most wanted." The same journal says that there are not half-a-dozen Faure batteries in existence which could be sent out to do a couple of nights' lighting with certainty. It appears that the company referred to persistently refuse to supply charged batteries for the use of consumers, although the uncharged batteries have been offered for sale

It certainly must be acknowledged that the secondary batteries under favorable conditions can supply electric current for incandescent lamps, and on a small scale, for obtaining mechanical energy, but the cost is not known and under the circumstances can safely be stated to be out of all proportion to their value.

It is equally true that future experiment may modify existing batteries or introduce such radical changes as to bring them within the limit of profitable investment, but at present the true state of the case is presented by *Engineer* when it says, "There is not at this moment any secondary battery in existence, the success of which is so assured that the inventor would be justified in asking the public at large to invest in it."

ELECTRIC LIGHT NOTES.

The United States Electric Light Company began lighting the streets of Charleston, S. C., Dec. 5. The company now have 36 arc lights for street lighting, and 15 in the Agricultural Hall Building, and 107 incandescent lamps also in the Hall.

Engineering gives some interesting photometrical results of the Brush lamp, made at the installation of electric lighting at the Eastern Railway Station, Paris. The lamp was compared both with the standard candle and with the Carcel lamp.

WITH STANDARD CANDLE.

Incidence of Ray.	*Nature of Light.*	*Luminous Intensity.*
90 deg.....	.....Naked arc..... 444 candles	= 52 Carcels.
55 "	" " .....900 "	= 104 "
90 "	.....Ground Glass Globe.277 "	= 33 "

WITH CARCEL STANDARD.

90 deg.....	.....In Ground Glass Globe.....	49 Carcels.
55 "	" " "	85 "
90 "	.....Naked.....	79 "
65 "	"	114 "
55 "	"	101 "
30 "	"	64 "

The very rapid growth of the telegraph, telephone and electric industries has called forth the suggestion that schools be organized for the purpose of educating young men and women as electricians. The suggestion is certainly a very good one and if thoroughly carried out would do much to improve the present stock of electricians, and supply a want long felt.

The Board of Trade of Philadelphia filed a complaint asking the courts to order the Brush Company to remove its poles. The Company put in their answer Dec. 6, in which they state that the poles are a component part of the apparatus for producing the light. They say with reference to putting their wires underground that no method of carrying the wires underground has hitherto been brought into successful use even for the telegraph and telephone wires, which employ a much weaker electric current, and are, therefore, easier to insulate. The Company gave bonds to place its wires underground when an underground system has been found to be effective, and will not hesitate to do so.

The agent of the Wamsutta Mills writes to the editor of *Cotton, Wool and Iron* with reference to the Edison lights in the mills. The plant cost about $12,000, and consists of three K dynamos, each of the capacity of 250 A lights of 16 candle power each. One light serves four looms, giving an equal amount of light to each loom. In other parts of the mill the arrangement is such that one lamp lights about the same space as two four-foot gas burners. The whole system from the word go has moved along without a hitch. The agent says it is as cheap as gas at $1 per 1,000 feet; there is no smoke or heat from it; it is safer than gas; and it does not vitiate the air we live in. The dynamos are operated by one of the machinists, requiring but a small portion of his time. The power required is by actual test, one horse power for 8.6 lights of 16 candle power each. The cost for power, taken in connection with the power to drive the mills, is very light, at the night end of the day. They are unable to detect any increase

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in the consumption of coal, but the fires are probably burned a little lower. The cost of lighting our mill, which contains 51,000 spindles and 1,072 forty-inch looms, as follows, putting the power at $30 per year per horse power, is estimated as follows:

87 horse power for 300 hours at $30	$261	
375 lamps at $1 each	375	
Labor operating dynamos	90—	$726
Interest and wear and tear on plant at 8%		960
Total cost of electric light		$1,686

Meter-ites.

A Smoke Abatement Institute has been formed in England under the presidency of Mr. Ernest Hart.

The Executive Committee have decided to use gas burners of 600 candle power and upwards, placed 24 feet apart and 30 feet from the floor in the South room of the Crystal Palace, during the Electric and Gas Exhibition. The Exhibition promises to be successful.

The question of cheap gas is now creating a lively agitation in Montreal, which the gas company is seeking to meet by spreading broadcast a sheet containing a statement that gas is now being furnished to Montreal consumers as cheaply as it is to many American cities. The Montreal *Star* believes gas will be furnished to consumers at $1 per 1,000 cubic feet inside of two years.

The *Würtemburg Gewerbebiatt* fears that the coal beds of Germany will be exhausted at no very distant date. Within 20 years the production has increased from 12,300,000 tons to 59,900.000. In the same period the production of England rose from 85,400,000 to 149.000,000, of France from 8,300,000 to 19 400,000, and of North America from 15.200.000 to 70,300.000. The coal fields of Germany cover 3,600 square miles compared with the 193,000 of North America.

The discovery of coal deposits in Algiers has been noted in a communication by M. Pinard, to the Académie des Sciences. Tests made with coal from Bou-Saada show a yield of gas and illuminating value equal if not superior to the results given by the best French and English coals. The yield of coke is varied between 62 and 66 per cent. of the coal carbonized. The veins of coal are found in company with immense deposits of white sand, the product of the disintegration of great beds of grit, of the same nature and origin as that commonly found with coal measures.

THE SMOKE NUISANCE.

THE EFFORTS TO SUPPRESS IT IN CINCINNATI.

(From our Special Correspondent.)

How to be rid of the smoke nuisance has been our great social problem, and the Cincinnati *Gazette* has taken the lead in insisting upon an abatement of the nuisance and such local legislation as would render the consumption or prevention of smoke compulsory. The opinion of this journal was endorsed by the manufacturers and business men, and about eleven months ago an ordinance was passed by council requiring all who own or use furnaces of any kind to consume their smoke, leaving it to the discretion of the police court judge; to determine if in any case it is or is not practically complied with. An inspector, Wm. Olhaber, was appointed to see to the enforcement of the law and, within the time named, the nuisance has been abated not less than fifty per cent. A brief history of the public effort to accomplish this result by means of various devices, is the object of this article.

The first device introduced in Cincinnati that effected any consumption of smoke was one applied by a gentleman named Burkhardt about a quarter of a century ago. Its intention, however, was probably to economize fuel, and consisted of the injection of superheated steam into the fire box. The next in order appears to have been one known as Baum's arch, which was simply a fire bridge built from above, instead of from below, to within a short distance of the fire bed, thus forcing the gases to pass immediately over the incandescent coal. The next was Walker's double furnace, which consisted of two fire boxes, built side by side with a fire bridge between, so arranged as to cut off the draft from either one and force it to pass through the other, to reach the flue. A bed of incandescent coal having been made in one, the draught was shut off from the other in which fresh fuel was being burned, and the vapors passed over this fire bed before reaching the flue, thus burning the carbon. The next device used was Murphy's Automatic Stoker, by which the furnace was fed with fuel, without opening the doors, in small quantities and often. The next was Sinton's series of arches, which forced the gases and vapors to take a long journey through the heated furnace. And the next was the Hutchinson device at first and still in use on the furnace of the Cincinnati *Gazette*. It consists of the injection of jets of superheated steam from each side at a certain angle over the coal bed. So soon as the compulsory ordinance was passed, the inventive genius of the city was stimulated into unusual exertion and devices multiplied to an extent quite beyond the limit of this article to describe or even mention. Those, however, which have met with more or less success are about 15 in number, of which six are systems of arches, six steam jets, and three stokers. All the devices range themselves under one or the other of these classes, being different modifications of the principles supposed to be involved in each. The brains of by far the greater number of inventors, however, have been exercised upon steam jet devices. While many of these various devices have proved meritorious, it is proper to mention at this point that experience has proven a first-class, careful human stoker to be the best device of any. There are so many of these, however, so imperfectly constructed and so unreliable, that mechanical contrivances are a necessity. The construction of arches and automatic stokers really rest their claims to greatest efficiency upon the assumption that the chief requirement for the burning of smoke is a continuous degree of heat in the furnace, sufficiently high to combust the gases, and that with this ensured, the draught of air sufficient to carry off the vapor supplies all the oxygen that is necessary to the process of combusting the carbon. The inventors of steam jets reverse that assumption and hold that the uncombusted carbon escapes in the form of smoke, because there is a want of oxygen to complete the process and that the heat usually generated in a furnace is sufficient, although by introducing oxygen and burning all the combustible elements of the coal the heat is increased and fuel economized. The object of the arches built from above is to bring the smoke, as stated, close to the incandescent coal, and thus to apply the necessary degree of heat claimed to be necessary in the stoker system. There has been a general disposition of manufacturers and others to comply with the law and consume their smoke, but they have regarded the various devices with suspicion. Fear, at the outset, was expressed that the steam jets would, by concentrating a high degree of heat beneath the boilers, burn them quickly out. With many imperfect devices of this kind, perhaps, this fear was not entirely groundless, but the writer is informed by Mr. Inspector Olhaber that there has been no instance of such a result come to his knowledge, and that this is not a necessary consequence seems to be demonstrated by a two years' continuous use of the Hutchinson device in the *Gazette* furnace, as well as that of the Bellevue incline plane, where it has been used for nearly the same length of time. The arches, while proving apparently efficient in consuming the smoke, have not as yet, it would seem, been constructed in a manner and of such material as to render them durable. The intense heat and the expansion and contraction breaks them all down. The automatic stokers prove to be more effective in large than small furnaces, but they are free from one of the greatest difficulties experienced in the use of, but not incident to, the other devices—that is the inattention of firemen, who put in too much coal, leave the furnace doors open too long, or fail to turn on the jets. It is not improbable that by some combination of the automatic stokers and steam jets this difficulty may be overcome at the same time that the most perfect combustion is accomplished by effecting all three conditions that appear necessary to complete success; to wit: systematic feeding, a continuous high temperature and a sufficient supply of oxygen. As matters now stand there is a fair outlook for a satisfactory abatement of the smoke nuisance, so far as furnaces are concerned, before winter is over. When all the smoke has ceased to pour from the thousand flues of the manufactories it will then be determined what proportion they furnish of the dense canopy of smoke that still hangs over the city, and how much of it during the winter is the product of private residences, which the compulsory ordinance does not affect. It is not improbable that where soft coal is exclusively used for fuel in a city, its smoke must always constitute a nuisance, and already, as if in recognition of this fact, there is being brought to the front as a solution of the smoke problem, the exclusive employment of crude coal gas for purposes of heating and cooking. It seems, in fact, to be in the near future.

THE DRONES OF THE PLUMBERS' HIVE.

[From our Special Correspondent.]

CHICAGO, *Dec.* 7, 1882.

The Master Plumbers' Association of Chicago held their quarterly meeting at their handsomely furnished quarters, No. 185 S. Clark street, this evening. Although the thermometer stood six below zero, with the rush of work that statement involves, there was a goodly attendance, the officers present being Secretary Alex W. Murray, Sergeant-at-arms James H. Roche, and Committeeman, Wm. Sims. Aldermen Sanders and Ryan were understood to be frozen up at home, hence a promised tilt on the merits of the Durham system was postponed. After informal discussion, the evening's paper, the joint product of J. J. Wade and William Sims, commanded close attention. It treated of the "Drones of the Plumbers' Hive" and singled out, for special reprobation recreant apprentices. They were an expensive nuisance to plumbers the country over. They started out to learn the trade, but quit when just beginning to earn their salt and so deprived the one who educated them of services that honestly belonged to him. The renegade boy should be "boy"-cotted. There were apprentices who were faithful and true to their employers, and it was recommended that some special honor be bestowed upon them; for instance, that a badge of merit be distributed among the worthy young ornaments of the trade, and that it be held as a sort of passport to the best employment and wages. By such token they would be known as excelling in the line of business they followed, and the device would be an encouragement to first-class work. There should be some kind of an apprentice system that should be binding both on the employer and employé. This was a matter that interested every master plumber in the United States, and especially concerned parents who desired that their boys should learn a trade of this kind. At present it was too generally a shame and a scandal to the plumbing fraternity that intelligent boys could not be induced to learn the plumbing business.

The Association's next meeting will be the Thursday before Christmas.

ARTESIAN WELL AND SPRING WATER.

MADISON, WIS., *Nov.* 15, 1882.

To the Editor of THE SANITARY ENGINEER:

Thinking that it may possibly be of interest to you, I enclose you a copy of the analysis of the water from the first artesian well of the group to be bored to obtain the water supply for this city.

The well, which is 5 in. in diameter, is sunk through 215 ft. of drift, and 535 ft. of Potsdam sand rock to the granite.

The water raises to a point about 4 ft. 6 in. above 4th Lake or Lake Mendota, and about 18 in. above the natural surface of the ground about the well.

According to the R. R. levels, its flood line is 275 ft. above Lake Michigan, and 853 feet above the sea level.

The well has been pumped from at the rate of 480,000 gallons per day without reaching the limit of its capacity. Two other wells, 8 in. in diameter, are now being drilled.

Would be pleased to give you any further information you might desire. Yours truly,

CHESTER B. DAVIS, *M. Am. Soc. C. E.*
Chief Eng. Madison Water Works.

"Prof. W. W. Daniells chief chemist at the State university, has just completed an analysis of the water from the city artesian well, which is to supply the Madison water works. The analysis is as follows, the composition being expressed in grains per United States gallon—a comparative statement of the composition of the Bethesda spring at Waukeska, being also given:

	Madison City Well.	Waukesha Bethesda Spring.
Potassium sulphate	0 237	0 454
Sodium sulph te	0 286	0.542
Sodium phosphate	trace	tr ce
Bi carbonate of soda	1 094	1.356
Bi-carbonate of lime	15 234	17.022
Bi-carbonate of magnesia	12 984	12.388
Bi-carbonate of iron	0.214	0 042
Sesqui-oxide of aluminum	trace	0.122
Selica	0 414	0 741
Sodium chloride	0 293	1 160
Organic matter	.....	1.963
Total solid contents per gallon	30.755	35 710

"It will be seen that our city water is better in several respects than the Bethesda, but generally does not vary greatly from it.

"The relative hardness of the city artesian well water and the water of the lakes, is as follows: Lake water, 10.2; city well water, 7.3. It will therefore be seen that

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the lake water is forty per cent. harder than the city well water. Experiments were made regarding the effect of the well water on metal pipe: After standing thirty days in contact with a clean piece of lead, there was no indication of lead in the water; galvanized iron pipe under precisely similar conditions gave a trace of zinc in the solution. From this it will be seen that, unlike the water in many cities, ours does not effect lead pipe and therefore no harmful result can happen from the use of that metal; on the other hand, galvanized iron might produce slightly deleterious effects.

"The city can heartily congratulate itself in having such pure, soft, and in every way admirable water, as is to be distributed by the water-works system; it is as good for drinking as Bethesda mineral water and thoroughly adapted for all domestic purposes."

[If Madison has succeeded in obtaining a free supply of pure, soft and palatable water from its new well it is to be congratulated, as the depth from which the water comes will exclude the probability of its ever becoming a carrier and distributer of the poisons of zymotic disease. The test of its action on lead is satisfactory; but we conceive that thirty grains of inorganic solids per U. S. gallon are more than would be generally considered desirable in a city supply. We must, however, judge of such matters by comparison, and if Madison in this instance is replacing a water which contains more of these substances by one which contains less there is so much gained. The resemblance of the water to that of the Bethesda mineral springs rather unsuits it for domestic purposes—its lime and magnesia salts contra-indicating the term *soft* as applied to it. The analysis by Prof. Daniells is purely inorganic, and does not indicate the presence or absence of organic matter by any of the processes used by sanitary analysts. Presumably the water is free from organic mater by virtue of its filtration through the beds of drift and sand-rock, but it would be as well to verify the presumption.—ED. SAN ENG.]

EXEMPTION OF PLUMBERS FROM ZYMOTIC DISEASES.

TORONTO, *Dec.* 2, 1882.

To the Editor of THE SANITARY ENGINEER:

I have read with considerable interest the articles in your journal of Nov. 2 and Nov. 23 on the above subject, and, like our friend Mr. Hughes, consider it a subject well worthy of investigation, and one that ought to awaken a particular interest with the plumbers themselves.

I regret, however, that I cannot fully endorse the views laid down in these communications. My experience for over 20 years has been that plumbers are particularly liable to contagion from the so-called zymotic diseases, whether or not it is caused by inhalation of disease germs during the performance of their work, or from other causes.

I am not in a position to show, but certainly the death rate of plumbers from typhoid and diphtheria is very high. We have had in our city five deaths from the above diseases (in our ranks) within as many months; only this week two brothers, both employed in the plumbing business, succumbed to this fearful malady.

The writer has been particularly unfortunate in this respect, having been a victim to its ravages on two different occasions—once in New York, and at that time (1870) there were no less than 43 members of the League incapacitated from their work, and the majority of the cases were of the infectious or zymotic class. It must be borne in mind that there were then no plumbing laws in existence, and New York had not the best appliances in the world.

If Dr. Burrall will compare statistics of the above date with the present he will probably find a marked improvement in the general health of plumbers in New York, which, no doubt, is greatly due to the steady advance of sanitary reform.

The remarks of Mr. Hughes or his physician, that the system can take in large doses of poison without producing serious effect, are probably true in the way in which he puts them, but the better way is to avoid the small dose and it will not be necessary to take the larger. The fact that plumbers can and do perform some very unpleasant work without any apparent discomfort to themselves, simply because it is their daily duty to do such, is no argument in favor of their exemption; for some time the disease will catch on, and with fatal results, too.

W. J. BURROUGHES.

FRENCH PLUMBING.

TORONTO, *Dec.* 2, 1882.

To the Editor of THE SANITARY ENGINEER:

I notice in your issue of Nov. 23 an inquiry from Mr. Brown for a work on Plumbing Practice in France, and your remarks thereon.

In reply to Mr. Brown's query, would say that I was engaged in the plumbing business in Paris and in Strasburgh for nearly two years, and in all that time I never met a Frenchman who could do a decent job, much less write a work for others' guidance. A stranger looking upon their gilded palaces, grand saloons, picturesque parks, and their élite society, has no idea of the methods employed in disposing of their garbage and night soil, which is usually done in early morn before many people are likely to be eye witnesses. W. J. B.

TRAPS AND AIR INLETS ON DRAINS.

(A SHODDY JOB.)

CLINTON, IOWA, *Nov.* 20, 1882.

To the Editor of THE SANITARY ENGINEER:

Last summer I was called on to plan a system of sewerage for one of our best dwellings, it never having been connected with the public sewer. We arranged the plan with a grease trap outside the house, and into it discharged only the waste from the kitchen sinks, the grease trap or reservoir discharging into the house sewer leading to the street sewer. This house sewer I extended past the grease trap, along side of house, outside, some 25 feet to receive the waste from two bath tubs, one water closet, and two basins. I planned a ventilating trap in this house sewer near where it passed the grease trap; the air vent of this trap was to have been on the house side so as to ventilate the house sewer and soil pipe, it extending above roof. Some time after the job was done the inmates complained of sewer gas in the house. We personally attended to the grease trap and believed it correct, and we left the pipelayer to complete the balance of house sewer by putting in the trap and laying balance of pipe. When the presence of gas was detected we carefully examined what we could see of the works in the house and found them correct, and found that the seal of the trap to the Jennings' water-closet was forced, it being very little more than ¼ inch. We decided to open up and examine the ventilating trap, and here we found the trouble. The pipelayer not finding a ventilating trap put in a running trap, and so set it by placing it out of level that there was no water seal. I measured and found it lacked nearly two inches of sealing. We had it torn out and a ventilating trap put in and saw that its seal was good. Since this there has been no complaint. This proves to me that your method of trapping house sewers is correct. No ventilating the main public sewers through the house pipes for me.

Very truly yours for sanitary improvement.

W. W. SANBORN.

[From your description we infer that there was some defect inside the house which was only made apparent when the gas from the sewer had ready entrance to the house drains. If your house pipes and joints were tight, traps protected against syphonage and soil pipes open above the roof, you would not have had the smell you complain of. Suppose you try the peppermint test inside the house?]

VACUUM VALVES.

MACON, GA., *Nov.* 18, 1882.

To the Editor of THE SANITARY ENGINEER:

My enquiry of the 13th October, to which you now very kindly reply, was prompted by the fact that in a new building fitted with a copper boiler of the best make, supplied with the safe and vacuum valve of your illustration, the boiler suffered a total collapse when the water company suddenly turned off the water a few days before the date of my letter. The water company promptly replaced the boiler with a new one, because they neglected to give notice of their intention to turn off the water; but I now desire to learn whether or not such accidents are preventable. I always use the open end relief pipe where there is a tank to carry it above, but when you have city water at 45 lbs. pressure what do you do? Yours truly, B.

[It would seem that your experience justifies our opinion that it is not always safe to rely on safety and vacuum valves on range boilers. Under the conditions named by you, viz., that you have a public water service with an average pressure of 45 lbs. to the square inch, we should advise you to take this supply to a tank, controlling it by a ball cock. Then take your supply to the boiler from this tank, returning the hot water pipe above and over the tank as a relief pipe. You will see this illustrated and fully explained in Sanitas Articles, vol. iv, page 251. You can then use copper boilers with safety.

The only other plan is to use galvanized iron boilers. This is cheaper, but not so desirable, although generally done. How your water will be effected by contact with galvanized iron you can ascertain by trial.]

EXHAUST STEAM FOR HEATING WATER.

SPRINGFIELD, *Dec.* 5, 1882.

To the Editor of THE SANITARY ENGINEER:

We have an abundance of exhaust steam in our hotel from two elevator engines, passing through a 3-inch pipe to the roof. What is the simplest way to utilize it for warming the water which is distributed throughout the house for culinary purposes and for the ash basins? Now we use live steam from the boiler and pass it through a box coil of 1-inch brass pipe, the coil being within a tank four feet diameter by six feet long. We have been told that if we force the exhaust steam through the one-inch coil it will make too much back pressure on the engines; even assuming it (the steam) has heat enough in it to warm the water properly. An early answer through your paper will oblige

Yours respectfully, W. J.

[There is nearly all the heat in the exhaust steam there was in the live steam as it entered the engine, but the temperature will be lower. Still it is sufficiently high to make the water almost boiling, and it certainly will make it hot enough to scald when drawn at the faucet; unless the water has to travel in the pipes an unusual length.

The usual way to utilize the exhaust steam in New York buildings is to have a tank of the size required and pass the exhaust pipe, full size, two to six times through it in the form of a flat coil. The pipe is generally brass, with brass bends, and supported on bars set across the tank. When exhaust steam is used in a box coil the way you require it, make as large a connection as the *header* in the coil will admit of, between the exhaust pipe and the coil, but leave the exhaust pipe in other respects the same as it is now, except to place a back pressure valve at some convenient place in the exhaust pipe above the branch to the tank. With the assistance of the back pressure valve you can force just the steam you require into the coil, allowing the remainder to escape to the roof. In this case you will not be compelled to force all the exhaust steam through the coil.]

A GOOD IDEA.

NEW HAVEN, CONN., *Nov.* 26, 1882.

To the Editor of THE SANITARY ENGINEER:

I take the liberty to address this letter to you, knowing as I do, that your valuable paper is the recognized authority on sanitary matters, etc., above all the plumbing papers published this side of the water; also, that you will be pleased to hear at all times of anything occurring in the interests of good plumbing, and for the reasons above named I pen these lines.

For the past year it has often occurred to me what a benefit it would be to the journeymen plumbers of this city if they should band together and form an association for mutual improvement of its members, in studying the higher branches of their chosen profession, and after some little work, and with the help of a few plumbers I succeeded in having a gathering of most all the craft, some two weeks since, and after appointing a chairman (your respectful scribe having been chosen), and in response to a query, I gave my prospectus of what I thought would be an ideal association for the plumbers of this city, my plan being as follows: First, elect officers, levy a tax on members, payments to be made weekly for a month's time, and at an early date as possible, rent an apartment, and furnish it with standard sanitary works, papers, etc., have cuts of good and bad plumbing open to inspection, and at stated times in each month have debates on matters pertaining to the business. Also, at different periods, have a professor of Yale lecture on ventilation, etc. Well, after some little opposition from some of those present, who wanted a *union* and meet only when trade protection was needed, we formed an association to meet once a week. We elected officers and have some money in the treasury, and as I have been authorized to frame by-laws, I would consider it a favor if you would send me a copy of the by-laws of the Plumbers' Association of New York City.

R. C. ENSIVE,
27 Edward st., New Haven, Conn.

[We believe our correspondent entertains the correct idea of the proper sphere of such an organization as the journeymen plumbers of New Haven should have, and this movement is very creditable to their intelligence.]

Savannah, Georgia, was left without water for six or eight hours, on November 25. The connection which had been made between the old and new force mains blew out. The city is supplied by pumping into a stand pipe, and there is, consequently, no reserve in such a contingency. Fortunately, accidents of this kind are rare in towns which take their supply directly from the pumps. At Indianapolis, which is supplied by direct pumping, an accident to the pumps occurred a few weeks ago, followed by the breaking of the main supply pipe, and the city was without water for the greater part of a day, before the breaks could be repaired. By extraordinary good luck, no fires occurred during the suspension of the supply.

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NEW YORK PLUMBING SPECIFICATIONS.

The following is the text of the new edition of plumbing specifications just issued by the Board of Health of this city. The changes from the previous edition are denoted by italics; most of them, as will be seen by comparison with the old (found on page 264 of Vol. V. of THE SANITARY ENGINEER), are slight verbal alterations not affecting the spirit of the regulations. The part relating to earthenware drain is, for the first time, embodied in the specifications, though the use of tile drain has been for several months permitted, subject to the regulations (found on page 65, Vol. VI. of THE SANITARY ENGINEER) which have been furnished on a separate sheet.

SPECIFICATIONS FOR THE PLUMBING AND DRAINAGE

of....house...on the...side of....street ....feet... .. of.....street.....owner..... address.....architect..... address....plumber... address.

Pursuant to the provisions of Chapter 450, Laws of 1881, the accompanying plan for the plumbing and drainage of each of the above-mentioned houses, and the following description thereof, is hereby submitted for the approval of the Board of Health, the undersigned hereby agreeing to cause the work to be done and the material to be furnished in accordance therewith, with such modifications as may be required by the Board of Health.

I.—GENERAL DIRECTIONS.

The plumber will furnish all materials and perform all labor requisite and necessary for putting up and completing all the plumbing work in a good and thoroughly workmanlike manner, according to the drawings and these specifications.

Where the specifications vary or conflict with the drawings, the plumber is to be governed by the specifications.

The plumber will send notice to the Board of Health when the work will begin.

All materials will be of good quality and free from defects.

The arrangement of soil and waste pipes will be as direct as possible, and, wherever practicable, the drain, soil, and waste pipes, and the traps will be left so that they may at all times be readily examined and repaired. Where they are necessarily placed *in partitions or recesses in walls*, they will be covered with face boards which will be fastened with screws, so as to be readily removed.

The plumber will also, except as herein otherwise provided:

II.—WATER CONNECTION.

Obtain and pay for all necessary permits, and comply with all corporation laws relating to *the subject matter of these specifications.*

Excavate for and insert tap in street main, if necessary.

Connect tap and house supply at point indicated on the plans by....lead pipe to weigh....per foot, to be laid.... feet below curb level.

Place a stop-cock at. ..to shut off the water when necessary.

Grade each line of supply pipe, so that it can be completely emptied at its lowest point.

III.—HOUSE SEWER—OF IRON.*

For each house make a separate connection to sewer in street, by....inch cast iron pipe....*inch thick*, run at a uniform grade to a point just *outside* of the cellar wall.

HOUSE SEWER—EARTHENWARE.

[NOTE.—*The laying of earthenware drain pipe for house sewers, in made or filled ground, is prohibited by the Rules established by the Board of Health. But where the soil consists of a natural bed of loam, sand or rock, it is permitted to be laid from the front wall to the street sewer, if laid in strict compliance with the following directions.*]

The.....will make the necessary excavations for the house sewer from the front wall to the street sewer, making a smooth bottom for each pipe, free from all projections of rock, and with the soil well rammed to prevent settling of the pipe. And the....will make a separate connection for each house with the street sewer by an earthenware pipe.....inches in diameter, hard and salt glazed, and cylindrical, and... of an inch thick; extending the same to within... feet of the front wall. Every section will be bedded in cement at the hub and along its entire length. The ends of the pipe will be wetted before applying the cement, and the space between each hub and the small end of the next section will be completely and uniformly filled with the best quality of hydraulic cement, care being taken to prevent any cement being forced into the drain to become an obstruction. No tempered up cement will be used. A straight edge will be used inside the pipe, and the different sections laid in perfect line on the bottom and sides.

COVERING HOUSE SEWER.

Notice will be sent to the Health Department when the house sewer is ready for inspection; and it will be covered only after it has been examined and pronounced satisfactory by an Inspector from the Board of Health. In filling the trench no stones will be placed in contact with the pipe, and the earth will be thoroughly packed in without moving the pipe in the slightest degree, or starting any of the joints.

* The substance of Section III. in the previous form of specifications is here divided into Sections III. and IV. and the note and paragraphs in relation to earthenware drain pipe added.

IV.—HOUSE DRAIN.

The plumber will make a proper connection with the house sewer, and set a ...inch cast-iron running, *or half S trap* just inside of the front wall, with a hand-hole for cleaning, having a cover properly fitted and joined with ....cement; the trap to be provided with a fresh air inlet on the house side thereof, of....inch cast-iron pipe, extending to....

Continue the house drain of cast iron,....inches in diameter, and .. *inch thick*, along the cellar wall *or ceiling* from trap, or in a trench cut at a uniform grade [walled up on the sides and provided with movable covers. *Previous specifications*] and having a hydraulic concrete base of four inches in thickness, on which the pipe is to rest, to the point shown on the plan, giving it an even fall to the trap of *not less than*....inch, *nor more than*... *inch to the foot.* Make necessary changes in direction by curved pipes, and all connections by Y-branch pipes and one-eighth bends. from the points shown on the plan, branch pipes to be connected with the drain pipe to receive the soil and waste pipes, the rain water leader and the connections from the area, cellar, and yard cesspools.

V.—UPRIGHT SOIL, WASTE, AND DRAIN PIPES.

For each water closet or line of water closets provide and set....inch cast iron soil pipe...., connecting with the house drain by a Y-branch and extending two feet or more above the highest part of the roof or coping. If near a light-shaft,....feet above the roof. The soil pipe to have....inch branches to receive the traps of the water closets on each story.

Provide and set, with proper connections for each basin, bath, sink, urinal, wash tray, and tub, or tier of same,.... inch cast iron waste pipe...., connected by a Y-branch ....with the house drain, and terminating above the roof in the same manner as the soil pipe. Connect each of the set fixtures with the waste pipe by a short length of.... inch lead pipe, with....inch trap.

Make all connections by Y-branches.

The....will provide .. leader *outside* the house, of galvanized sheet iron ...inches in diameter, to connect with the house drain by a cast iron trap .. inches diameter, *to be set and connected by the plumber;* or the....will provide leader *inside* the house, of cast iron ...inches in diameter, caulked with lead, in same manner as the soil pipe, to be trapped at the base, if it opens near a ventilating shaft *or window.*

Underline all set fixtures....with sheet lead of.... pounds per foot, with edges turned up at least ...inches, in a secure manner, to prevent overflow. Provide for each safe a....pipe, discharging either into an open sink, or upon the cellar floor, or outside the house as the architect may direct. *These waste pipes will not connect with the safe waste pipes from water closets or other fixtures, but may discharge into the same sink. In no case will a safe waste pipe be connected directly with the house drain, or with any pipe which discharges into the house drain.*

The waste pipe from the refrigerator will be....pipe, so arranged as to discharge into the most convenient open sink. In no case will it be connected directly with the soil or waste pipe, or the drain or sewer, or discharge upon the ground.

VI.—TRAPS AND TRAP VENTILATION.

Trap every water closet, urinal, sink, basin, wash tray, bath, and every tub or set of tubs effectively in the manner shown on the plan; the traps to be as near the fixtures as practicable.

Set for all water closets within the house... inch cast iron vent pipe, connected *by a branch pipe not less than two inches in diameter*, with the crown of each trap and extended above the roof in the same manner as the soil pipe, or connected with the soil pipe above the highest fixture.

Set for traps of all other fixtures .. inch cast iron vent pipe, connected by a branch pipe .. *inches in diameter*, with the crown of each trap, extending above the highest fixture, and there connected with the waste pipe, or extended above the roof separately, as the architect may direct. If the latter, the diameter will be enlarged to four inches from just below the roof upward.

NOTE.—It is not required that every trap shall have a separate air pipe; several may have branches into one vent, provided that each branch be as large as the waste it serves. It is imperative that every trap shall be so ventilated as to prevent syphoning and to ensure a free circulation of air through every foot of pipe.

Grade all air pipes so as to discharge water collected by condensation.

VII.—IRON PIPES, THICKNESS, TESTS

All iron pipes will be sound, free from holes and other defects, of a uniform thickness of not less than one-eighth of an inch for a diameter of two, three, or four inches, or five thirty-seconds of an inch for a diameter of five or six inches. Before they are connected each pipe will be thoroughly coated inside and outside with coal tar pitch applied hot, or with some equivalent substance satisfactory to the Board of Health. They will be firmly secured in position by....

Caulk all joints in all iron pipe with picked oakum and molten lead, and make the joints impermeable to gases, *by bedding the lead with hammer and caulking iron. No putty or cement joints will be permitted.*

Before any of the iron pipes are covered, stop all the openings, fill the pipes with water, and, if required, allow to stand twenty-four hours for inspection. If preferred by the Inspector from the Board of Health, the peppermint test will be substituted.

If any leak is discovered in a joint, make it tight or replace the defective pipe.

VIII.—LEAD PIPES.

Make all connections of lead with iron pipes by brass or copper sleeves or ferrules of the same size as the lead pipe, set in the hub of the branch of the iron pipe and caulked in with lead; the lead pipe to be attached to the ferrule by a proper solder; wiped joint when practicable. *No putty or cement joints will be permitted.*

Make all connections of lead pipes by wiped joints.

Secure all lead pipes firmly in place with hard metal tacks and screws.

IX.—WATER CLOSET CISTERNS.

The....will put up, on the roof, or over each water closet, or group of water closets, a ...cistern....x....x ....; and the plumber will connect the same with the supply pipes and arrange for the proper flushing of the water closets, leaving the whole in complete working order. In no case will a water closet be flushed directly from the Croton supply pipes; and the water from cisterns which supply water closets directly will be used for no other purpose.

Discharge the overflow pipe from each water closet cistern into an open sink, or into the bowl of the water closet, as the architect may direct. In no case will it discharge into the soil or waste pipe or into the drain or sewer.

X.—HOUSE SUPPLY TANK.

Provide a tank for drinking water, ...to be lined with tinned and planished copper, or constructed of....iron (under no circumstances to be lined with lead); and make all necessary connections with supply and house pipes. In no case will it be directly connected with a water closet; but the water closet tanks may be supplied from it.

The overflow pipe from the *house* supply tank will be *discharged upon the roof, or* carried independently to the cellar, with a deep trap, and empty into an open sink or open space.

If the pressure of the Croton is found to be insufficient to supply any fixture or any water closet tank, provide and set up a....pump, with all necessary connections.

XI.—NUMBER, LOCATION, AND DESCRIPTION OF FIXTURES, ETC.

Supply and set up in complete working order the following fixtures of the pattern and kind hereinafter described; the exit pipes to wash basins, bath tubs, wash trays, sinks, *safes*, and refrigerator wastes to be provided with strong metallic strainers:

	Basement.	1st Floor.	2d Floor.	3d Floor.	4th Floor.	5th Floor.	6th Floor.	7th Floor.	8th Floor.
Water Closets..... ...									
School Sinks.....									
Urinals.....									
Wash Basins.....									
Bath Tubs.....									
Wash Tubs.....									
Sinks.....									
Refrigerators.....									
Boilers.....									

CALIFORNIA PLUMBING LAW.

The following is the text of the bill to regulate plumbing in the cities of California, which is to be brought before the State Legislature:

AN ACT ENTITLED AN ACT TO GRANT TO BOARDS OF HEALTH, IN CITIES AND COUNTIES, THE POWER TO REGULATE THE PLUMBING AND DRAINAGE OF BUILDINGS.

SEC. 1. On or before the first day of August, eighteen hundred and eighty-three, every master or journeyman plumber carrying on his trade, shall, under such rules and regulations as the board of health of such city, or city and county, shall prescribe, register his name, and address at the health office of such city, or city and county; and, after the said date, it shall not be lawful for any person to carry on the trade of plumbing in any city, or city and county, unless his name and address be registered as above provided.

SEC. 2. A list of the registered plumbers shall be published in the yearly report of the health office.

SEC. 3. The drainage and plumbing of all buildings, both public and private, hereafter erected in any city, or city and county, shall be executed in accordance with plans previously approved, in writing, by the board of health of said city, or city and county; suitable drawings and description of the said drainage and plumbing shall, in each case be submitted and placed on file in the health office. The said board of health are also authorized to receive and place on file drawings and descriptions of the drainage and plumbing of buildings erected prior to the passage of this act.

SEC. 4. The boards of supervisors or other city or county officials, whose duty it is to make apportionments for the board of health of such city and county or city,

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shall make the necessary apportionment, and shall insert the same in the yearly tax levy, to provide for carrying out the provisions of this act.

SEC. 5. Any court of record in said city or city and county, or any judge or justice thereof, shall have power at any time after the service of notice of the violation of any of the provisions of this act, and upon the affidavit of the health officer or a member of the board of health of such city or city and county, to restrain by injunction order the further violation named in this act, or of any work upon or about the building or premises upon which the said violation exists, and no undertaking shall be required as a condition to the granting or issuing of such injunction or by reason thereof.

SEC. 6. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor.

SEC. 7. This act shall take effect immediately.

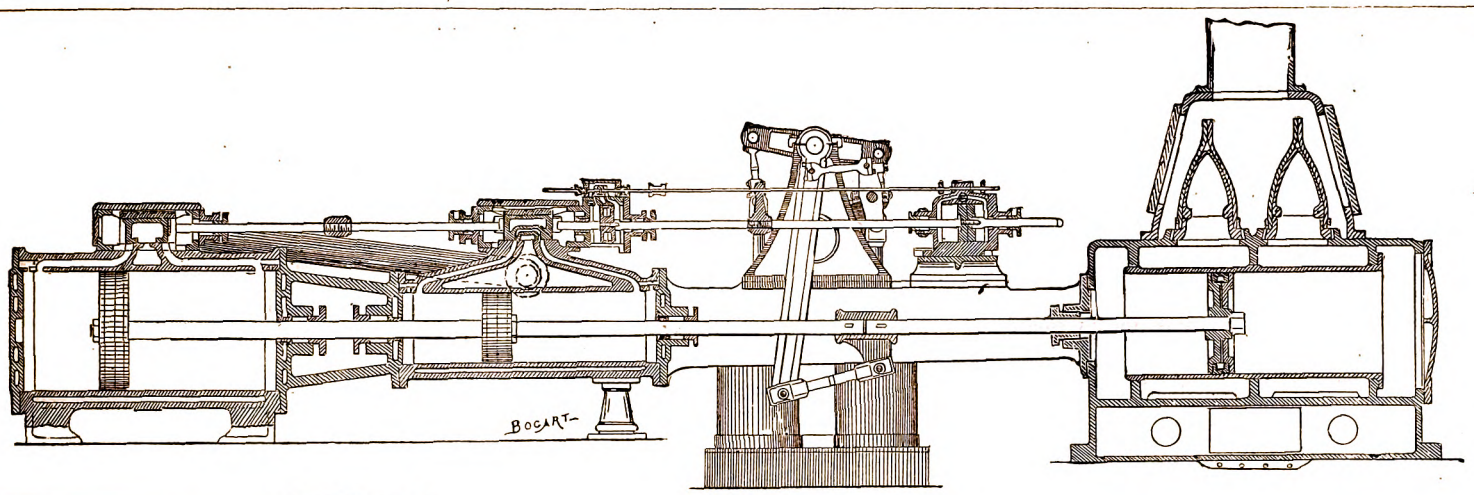
SEWAGE PUMPING ENGINES.

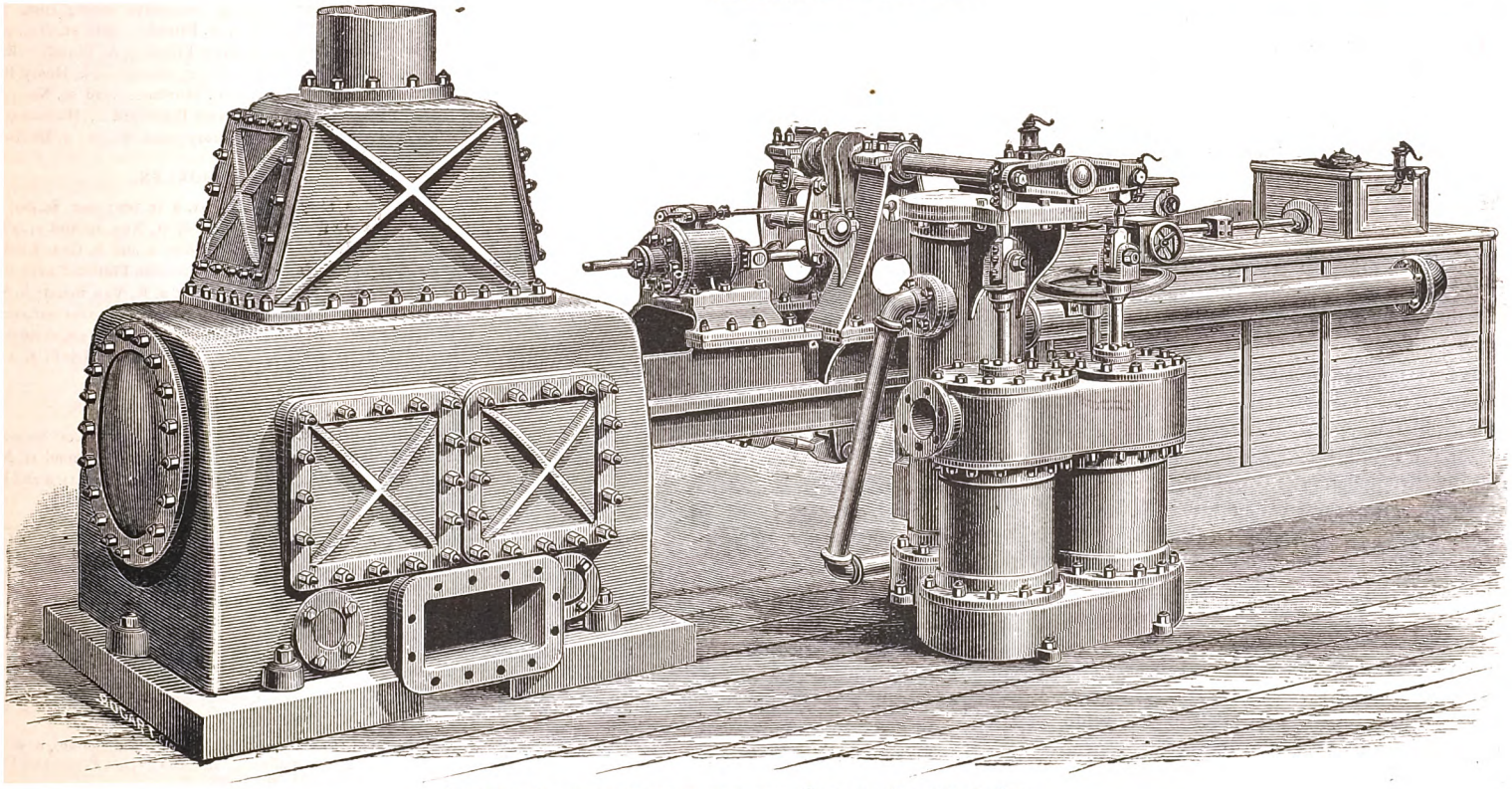
The accompanying illustration, for which we are indebted to the courtesy of the *American Machinist*, represents one of a pair of pumping engines used for pumping sewage at Pullman, Ill. The sewage of Pullman is utilized by distribution on a sewage farm some three miles distant from the pumping station. We have already described the sewerage system (in our issue of August 10, 1882), and will now only remind our readers that these engines, which are each of a capacity of 2,500,000 gallons in 24 hours, pump the sewage from a well into a 20-inch cast iron main, by which it is taken to a screening tank at the farm, and distributed through earthenware pipes to the land. The engines are of the direct acting, tandem compound condensing type, having piston pumps with phosphor bronze cylinders, fitted with valves especially designed for passing everything usually found in sewage.

The steam cylinders are fitted with the "isochronal" or self-regulating valve gear, which controls the speed under any variation in pressure or load, as in the case of the reservoir becoming exhausted, or the bursting of the main sewage pipes. The action of this valve gear is so satisfactory, says the *Machinist*, that it relieves the engineer of a large part of his duty, his presence, we are told, being required only in stopping and starting, and in attending to the lubrication. The cylinders are steam jacketed, covered with non-conducting material, and enclosed with a neat black walnut lagging.

The main steam pistons are arrested at the termination of the stroke by a positive steam cushion, which stops them without shock or jar. They are started in their stroke with an easy, gradual movement, this last named action being brought about by the operation of the cataract cylinder. (The small cylinder shown near the right of the upper sectional view). This cylinder is filled with oil, the flow of which from one end to the other of the cylinder is regulated by a graduated opening, connecting the two ends of the cylinder. The resistance offered by the oil to the piston of the cataract cylinder regulates to any desired extent the velocity with which the steam valves can be opened.

The condenser and air pumps are of the usual type, and are operated directly from their respective engine. The diameter and stroke of engine and pump are as follows: Diameter of high pressure cylinder, 14⅞ inches; diameter of low pressure cylinder, 25 inches; diameter of pump cylinder, 22 inches; stroke of all pistons, four feet. It will be seen that the ratio between the high and low pressure cylinders is about three to one. The steam pressure carried is 60 pounds. The engine is built by the Cope & Maxwell Manufacturing Co., Hamilton, Ohio.





SEWAGE PUMPING ENGINE FOR THE CITY OF PULLMAN, ILL.

The San Francisco, California, *Chronicle* suggests the construction of reservoirs on hills near the city to which the sea water might be pumped by wind-mills, and then used for flushing the sewers. There is very little rain from April to November, and the city water supply is not plentiful enough to permit of its use for flushing, nor is it enough for ordinary cleansing of the sewers, which consequently become filthy and offensive in the summer.

REPORT OF NATIONAL BOARD OF HEALTH.

The fourth annual report of the National Board of Health for the year ending June 30, 1882, is a lengthy and interesting document, which can hardly be summarized, and from which we can only give a few extracts. The greater part of the information given with regard to special scientific investigations under the directions of the Board has already been published and noticed in this journal. The following points, however, are new:

Prof. Mallett "has ascertained that the results of the so-called 'combustion process' of Frankland may be improved, and cleared of some at least of the inherent errors of the process as hitherto conducted, by evaporating the water in a partial vacuum, and the necessary details of apparatus suitable for the purpose have been worked out. It has been found that the suggested use of magnesia as the material for the expulsion of ammonia during the evaporation of the water is attended with loss of the nitrogen of certain classes of organic substances; while it appears that hypophosphorous acid, proposed as the means of reducing nitrates and nitrites, may be so employed with probably insignificant injury to the organic matter present." The results reported in the final memoir of Drs. Wood and Formad "seem to prove that diphtheria is a septic sore throat, dependent upon micrococci, which may be developed in an active state from the inert organisms always present in the mouth, or which may find entrance from without; that in scarlet fever, measles, and other affections, similar organisms exist in the blood in malignant cases, and may cause death after the original disease has spent itself, the patient dying of a secondary septicæmia; that so far as the observers can make out there is no difference between this

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micrococcus and *M. septicus* of Cohn; that an important aid to prognosis is afforded by a study of the blood; whenever the peculiar vacuoles we find in the white blood corpuscles are present death is almost inevitable, and so long as in the advanced stages of the exanthemata these vacuoles are absent the situation is hopeful." Upon this the Board remarked "That it only remains to ascertain the conditions under which 'the inert organisms always present in the mouth' or the same organisms introduced from without are developed into the 'active state,' and we shall, in all probability, have it in our power to apply absolutely preventive measures against a domestic scourge, which is far more destructive in the long run than either cholera or yellow fever."

We must confess just here that we do not share in the confidence which the Board seem to have as to the probabilities in this case. The recommendations of the Chairman of the Standing Committee of the Board on Registration and Vital Statistics. Dr. J. S. Billings, "that the United States should undertake to obtain reports of vital statistics from State registering authorities by paying a part of the expense of collecting them, the total expense being estimated at $25,000 per annum is approved," and the Board "considers it very desirable that Congress should, by special act, authorize the aiding in the collection of vital statistics in the manner indicated in the report.

A very large part of the report of the Board is taken up with the discussion of quarantine, including much historical matter, with regard to the development of quarantine systems in the United States. The conclusion of the Board is "that it is neither necessary nor desirable to clothe the central authority with quarantine powers in order to obtain a reasonable security against the invasion of foreign epidemics; that the argument so often triumphantly insisted upon, that it is only by means of a national quarantine that uniformity as to the regulations can be secured, is, in point of fact, specious and deceptive; and that the public health may be as efficiently protected under the system of coöperation with State and municipal boards of health inaugurated by this Board in conformity with the provisions of the act of June 2, 1879, as under any national system of quarantine which supersedes or interferes with State authority. Such a substitution of Federal for State authority seems undesirable for the following reasons:

"1. It is doubtful whether the exercise of the authority to regulate quarantine would not be in conflict with a decision of the Supreme Court in the case of Gibbons *vs.* Ogden.

"2. If it be admitted that the power exists, its exercise would be impolitic in view of the universal and strenuous opposition of the commercial emporiums of the country, especially on the seaboard.

"3. Any such assumption and exercise of power by the general government would involve the necessity of absolutely uniform regulations for all the ports of the United States, since the Constitution requires that no preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another.' Now, such a uniformity, as to details, of sanitary regulations is not practicable nor desirable for posts so differently situated as to climatic influences and as to proximity to foreign centres of infection as are the various ports of an extended seacoast.

"4. Such a system would almost certainly lead to the establishment of an enormously extensive bureau, with no better results in respect to the protection of the public health than will be realized under the system of coöperation with State and municipal boards of health when the latter system shall have been fully carried out by the establishment of a few more refuge stations, which can be effected at a very moderate outlay for construction and equipment and trifling cost for annual maintenance."

With regard to this conclusion, we will only say that while it may be politic for the Board to adopt this States' rights ground at the present time, we believe that the United States Government has the right as a nation on the ground of self-preservation, setting aside all technicalities with regard to commerce, to prescribe quarantine regulations for the whole country. The report closes with a defence of the Board against some of the most prominent charges which have been made against it. It is shown that under the constituting act it not only had the right, but it was its plain duty to make investigations into the causes and means of prevention of all contagious and infectious diseases, and that complaints that it has transcended its powers by dealing with anything but cholera and yellow fever are unfounded. In reply to the charge of extravagance, a table of the expenditures of the Board from the day of its creation to June 30, 1882, is given as follows:

Statement of the expenditures of the National Board of Health from April 1, 1879, to June 30, 1882:

On what account.	From organization to June 30, 1879.	Year ending June 30, 1880.	Year ending June 30, 1881.	Year ending June 30, 1882.
Floating Quarantine on Mississippi River.	.....	$10,238.11	$38,040.18	$17,796.42
Ship Island Station...	.....	18,988.89	34,203.13	12,743.62
Sapelo Station.....	.....	6,669.41	10,479.31	9,949.92
Elizabeth River, Va..	.....	3,812.16	3,246.54	1,259.78
Aid to Pensacola, Fla.	.....	3,006.28	4,444.86	.....
Aid to Pascogoula, Miss.....	.....	3,791.19	97.58	.....
Aid to Hancock Co., Miss.....	.....	.....	619.35	.....
Aid to Harrison Co., Miss.....	.....	.....	766.90	.....
Aid to State Board of Health of Louisiana.	.....	11,384.68	1,901.90	.....
Aid to State Board of Health of Texas....	.....	115.00	275.00	.....
Aid to Charleston, S. C.....	.....	38.60	7,585.32	112.80
Havana Commission..	$925.69	11,336.97	662.30	.....
Pay and Expenses of Inspectors at Havana and other places.	.....	31,459.39	11,204.92	3,011.70
Special Scientific Investigations.....	.....	14,495.59	10,192.83	8,715.31
Pay and Expenses of Members of the Nat. Board of Health....	4,044.25	12,736.27	8,845.87	5,069.68
Printing of Bulletin of National Board of Health blanks, etc..	669.94	6,882.73	9,984.62	9,992.38
Pay of Secretary, Disbursing Ag't, Clerks, Messengers, etc.....	1,678.10	18,258.02	18,656 56	17,802.19
Rent, Light and Fuel.	.....	1,009,28	1,564.34	1,457.59
Telegrams.....	29.21	1,678.34	322.53	238.79
Furniture, Stationery, etc., for Nat. Board of Health office.....	620.89	2,316.76	2,685.27	1,157.64
Miscellaneous Expenses of the National Board of Health....	1,081 03	4,577.83	1,157.48	798.69
Postage.....	92.25	702.26	260.60	580.22
Report on yellow fever Epidemic of 1878....	.....	1,800.00	.....	.....
Hudson Co., N. J., Investigation.....	.....	1,000.00	.....	.....
Purchase of Tents, Furniture, etc., for Stations	.....	9,297.41	485.45	.....
Aid to State Board of Health of Tenn....	.....	36,292.44	.....	.....
Aid to State Board of Health of Illinois...	.....	1,323.32	.....	.....
Aid to State Board of Health of Miss.....	.....	7,026.64	.....	.....
Aid to State Board of Health of Arkansas.	.....	6,399.76	.....	.....
Aid to Board of Health of Mobile, Ala.....	.....	2,195.46	.....	.....
Aid to Board of Health of Meridian, Miss...	.....	218.30	.....	.....
Aid to District of Columbia.....	.....	7,710.00	.....	4,656.06
Immigrant Inspection Service.....	.....	.....	.....	3,168.15
Totals.....	$9,146.41	$266,762.16	$167,681.95	*$98,523.07

* This sum is subject to increase to meet obligations prior to August 6, 1882, to which date the appropriations for the last fiscal year were extended. Estimated amount required $35,000.

NOTE.—Total appropriation for National Board of Health..... $700,000 00
Total expenditures as per statement..... 542,113 59

Balance unexpended June 30, 1882..... $157,886 41

The report concludes as follows:

"Having shown that the charges preferred against the Board, on the grounds of alleged extravagance and usurpation of authority not conferred upon it by law, are not sustained by the record, but, that on the contrary, the expenditures have been on a scale of extraordinary economy in comparison with the magnitude of the useful work accomplished, and that this work of every kind fell clearly and unmistakably within the limits of its discretion, the National Board considers it its duty again to recommend the granting to Congress of such an appropriation, at the ensuing session of Congress, as will put it in its power to execute the law which defines its powers and prescribes its duties, to the end of conserving the public health and of preventing the introduction of contagious or infectious diseases into the maritime ports of the country and their transmission along the trunk lines of railway into the interior States.

The following estimates for the year ending June 30, 1884, are therefore respectfully submitted:

For aid to State and Local Boards of Health.

By the maintenance of a refuge station at Ship Island, Miss.....	$18,000
By the maintenance of a refuge station at Sapelo Sound. Georgia.....	15,000
By the maintenance of a hospital barge at Hampton Roads, Virginia	2,500
By the maintenance of the inspection service on the Mississippi River.....	25,000
By the maintenance of the immigrant inspection service.....	$30,000
By the maintenance of inspections at foreign ports .	8,000
For miscellaneous investigations under the constituting act, March 3, 1879.....	10,000
For pay and expenses of the members of the Board..	7,000
For compiling and printing the Bulletin and for miscellaneous printing.....	15,000
For pay of Secretary, notwithstanding the provisions of sections 1,763—64 and 65—Revised Statutes, of which sum $600 shall be immediately available.....	1,800
For pay of Disbursing agent, clerks, messengers and laborers.....	13,500
For rent, light and fuel, telegrams and postage... .	2,200
For stationery and furniture.....	1,500
For incidental expenses.....	500
Total.....	$150,000
For aid to local quarantine stations and for aid to local and State boards of health, to be used in case of epidemic	$100,000

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Hudson st, n e cor Leonard st, br store; cost $44,000; o, Frederick Bechstein; a, G. W. da Cunha....39th st, No. 534 e, br ten; cost $16,000; o, Obadiah Ayres; a, Joseph M. Dunn; b, Nason & Hollister.... Riverside av, e s, 52.7 n 113th st, granite dwel; cost——; o, Agnes R. Sherman; a, A. B. Jennings .. 63d st, No. 421 e, nr Av A, br ten; cost $16,000; o, Ferdinand Sulzberger; a, Wm. Schickel; b, not selected....5th av, s w cor 126th st, 7 br s dwel; cost, ea, from $18,000 to $20,000; o, James Meagher; a, J. G. Prague....127th st, s s, 235 w 4th av, 4 Conn br st dwel; cost, ea, $19,000; o, Isaac E. Wright; a, Thom & Wilson; b, days' work....Manhattan st, Nos. 51, 53 and 55, 3 br dwel; cost, ea. $5,000; o, Haskin & Tappan....Grove av, now Trinity pl, e s, 150 n Cliff st, 5 fr dwel. total cost $15,000; o, C. Decker; a, W. W. Gardiner; b, P. P. Decker.

ALTERATIONS, NEW YORK CITY.

35th st, No. 159 e, br exten; cost $2,500; o, Edward Sweeney; b, John Maguire....Houston st, No. 98 w, arranged for store and ten; cost $3,000 or $4,000; o, Emma H. Putnam; a, Wm. Howe; b not selected ...Allen st, No. 47, br exten; cost $2,500; o, Barnard Wolbarst; a, J. Brandt; b, Ph. Kottlowsky....128th st, s s, 150 e 10th av; 1 double refrigerator building, extensive alter; cost, $6,000; o, David G. Yuengling, Jr.; a, A. Pfund....39th st. Nos. 322 to 326 w, re-build; cost $4,000; o, Andrew Finck; a, A. Pfund....Ridge st, No. 27, s w cor Broome st, front alter; cost ——; o, Henry Budelman; a and c, A. E. Fountain; m, J. L. Murtha....32d st, No. 439 w, br exten; cost $7,500; o and a, Damase Bouchard....Hudson st, No. 100, s e cor Franklin st, add one story; cost $6,000; o, Dr. Bechstein; a, G. W. Da Cunha.

BROOKLYN.

Adams st, s s, 25 e Bremen st, 2 fr ten; cost $9,400; o, Leopold Michel; a, G. Hillenbrand....Wall st, Nos. 12 and 14, s e s, 125 n of Broadway 2 dwel; total cost $6,600; o and b, Geo. Loeffler; a, Th. Engelhardt....Livingston st, at junction Flatbush av; 3 br stores and ten; cost $7,500 each; o, O. Spence; a, R. Van Brunt; b, S. W. Howard....Park av, n w cor Nostrand av, br fac; cost $16,000; o, Robert Dunlap; a and b, John Clark....President st, s s, 212.6 e Hoyt st, br engine house; cost abt $10,000; o, Buchanan & Lyall; a, A. J. Loretz; b, Carlan & Son.

ALTERATIONS, BROOKLYN.

North 10th st, n s, 150 e 2d st, add one story; cost $2,500; o, Tuttle & Bailey Mfg. Co.; a and b, J. Pitcher....Raymond st, Nos, 69 and 71, flat tin roof, etc., cost $2,500; o, John Lockitt; a and b, Hartt & Boyd.

CINCINNATI.—Jefferson near Correy street, b house; cost $6,000; o, and b, H. Jacob... 6th nr Plum, b house; cost $5,000; o, F. Wilder; b, Smith & Williamson...Freeman nr Lord, br cost $5,200; o, John H. Foster; b, J. B. H. Nolte....Freeman nr York; b house; cost $9,000; o, John H. Foster; b, J. B. H Nolte....Poplar nr McLean av, b house; cost $5,000; o, A. Hagerman; b, L. Denning .. Central ave., 94, 96 98, remodelling hotel, cost $6,000; o, Henry Kresz; a, D S. Schurman; by sub-contract ....Cor. 7th and Vine, remodelling hotel, cost $7,200; o, S. Hexter; a, D. S. Schureman; b, by sub-contract....4th st, 24, 26 28, remodelling carriage factory; cost $8,000; o, G. C, Milton & Son; a, D. S. Schureman; b, by sub-contract.

KANSAS CITY, KANSAS.—Brooklyn and Indiana av., n w cor, dwell, cost $12,000; o, Fuller... Indiana av, bet Forest and Tracy, store; cost $5,000; o. M. Morrison.

LOWELL, MASS.—Cor Nichols and Branch, fr ten blk; cost $20,000; o, E. A. Smith; a and b. J. G. Stedman .Westford st, fr dwell; cost $6,000; o, Mrs. C. I. Bowers; a and b, C. F. Varnum.... Thorndike st, b bldg; cost $30,000; o, C I. Hood; a, Merrill & Cutler; b, J. W. Bennett.

NEW HAVEN, CONN.—High, 37, br dwell, cost $7,500; o, G. C. Pettis; b, A. B. Treat....Beers, cor. Martin; br block, cost $6,000; a, T. J. Ackerman; b, L. V. Treat....Howard av, fr dwell, cost $5,000; o, F. A. Catlin...Howard av, br dwell; cost $14,000; o, P. Armstrong; b, H. W. Clark.

PHILADELPHIA, PA.—Colona & 10th, b factory; b, Robertson & Bryan ....Ward nr Wharton, five b dwells; o, Thos. Marshall....Locust, 13th, three dwells; o, Charles W. Budd... Oxford abt 19, five dwells; o, Jos. S. Allbright...Angle, e of 12th, nine b dwells; o James E. Cooper..n e cor Cumberland 3d, b factory; b, James A. Davis... Auburn and Trenton avs, b factory; b, James McCartney.....Oxford, east of 19th, five br dwell; o, Joseph S. Albright... Queen and Delaware av, br storehouse; o, W. Easby... Parker and Ridge av, four br dwells; o, E. E. Parker ... Wood, east side Spring, five br dwell; o, S. S. Keeley.... Girard and Ridge avs, br market house; b, J. H. Young.... Wood, n e cor Centre, br dwell; b, C. J. Wallace....Poplar, n e cor 26th, br. factory; b, F. W. Tweed .. *Alterations.*—Race, e side 4th, church to storehouse, o, John Lucas & Co....Berks, n e cor 8th, market house to factory; o, Schummel & Co.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING DECEMBER 2, 1882.

(COMPILED FROM DATA PLACED AT OUR DISPOSAL BY THE NATIONAL BOARD OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland.....Maine	34,390	15	22.4	3	20.0	1		3	1															
Boston.....Mass	399,446	176	22.9	53	30.1	6	1	39	2	8	13	1	3		4	16		8	1		3			
Cambridge.....Mass	56,566	26	23.4	8	30.8			5	1		1					6		2			2			
*Worcester.....Mass	58,295																							
New Haven.....Conn	68,234	33	25.0	9	27.2	3		6					3	1		2		2					2	
Providence.....R. I.	111,987	57	26.4	10	17.8		1	3		2	4		12			6		3					2	
Total	670,623	307	23.4	93	30.2	10	2	56	4	10	18	1	18	1	4	30		15	1		5		4	
EASTERN CITIES.																								
Albany.....New York	97,035	66	34.4	34	51.5	3		2	5	1	1		3		4	4	1	1		7	1			
New York.....New York	1,282,349	584	23.4	213	38.1	22	2	106	10	13	28	6	6	5	14	69		31		4	6		9	
Brooklyn.....New York	624,776	223	18.2	106	47.5	1		35	11	2	16	2	1	8	6	34		15			5		1	
Hudson Co.....New Jersey	222,675	94	19.2	44	46.6	5	3	8	6		2	1	1	1	2	18	3	5		3	1			
Newark.....New Jersey	145,701	56	19.7	22	39.2	1	3	9		2	4		3	1	1	4		3			1			
*Camden.....New Jersey																								
Philadelphia.....Pa.	896,157	376	21.8	129	34.3	5		45	13		42		5	2	5	27	7	13				3	4	
*Reading.....Pa.																								
Wilmington.....Delaware	46,087	16	17.7	6	37.5			2													1			
Total	3,311,567	1,415	22.9	554	39.1	38	8	207	45	18	93	9	19	17	32	156	11	68		14	15	3	14	
LAKE CITIES.																								
Buffalo.....New York	166,235	64	19.7	32	50.0	3		3	2		7		3		7	5	2	1					1	
Rochester.....New York	91,616	19	10.5	5	26.3			3	2		1	1			1	2					1			
Syracuse.....New York	54,118	18	17.1	4	22.2			5	2				2											
Cleveland.....Ohio	186,277	50	13.0	3	6.0		2	4	4		7		4			4							1	
Detroit.....Michigan	128,431	52	21.0	25	48.0		1	6	5		12	1			5	1		1			1			
Chicago.....Illinois	580,625	183	16.1	66	36.0	5		18	6	1	12		8		4	20	2	4		1	2	3	1	
Milwaukee.....Wisconsin	131,661	48	18.7	22	45.8	1		4	2		6			1		3		3	1					
Total	1,339,013	434	16.6	157	33.8	9	3	43	23	1	45	2	17	1	17	35	4	9	1	1	4	3	3	
RIVER CITIES.																								
*Allegheny.....Pa.																								
Pittsburgh.....Pa.	185,135	70	19.2	14	20.0	7		10		2	3		11		1	5		3			1	1		
Cincinnati.....Ohio	265,471	97	18.7	29	29.8	4		18	3		1				4	9		2			1			
*Dayton.....Ohio																								
Louisville.....Ky	130,116	60	23.9	13	21.6	3		12	1		1		2	1		8		2					2	
Indianapolis.....Indiana	84,443	22	13.5	9	40.9	1		4	2		2		2		2	2		1	1				1	
Terre Haute.....Indiana	29,660	8	13.5	4	50.0			1	1							1								
Minneapolis.....Minn	88,728	24	14.0	6	25.0	1	1	3			1		2			4	1				1	1		
St. Paul.....Minn	51,463	31	31.3	7	22.5	2	1	2		1	5		7				1				1			
Total	835,016	312	19.2	82	26.3	18	2	50	7	3	13		14	1	7	29	2	8	1		4	2	3	
PACIFIC CITIES.																								
*San Francisco.....Cal																								
Total																								
SOUTHERN CITIES.																								
District of Columbia.....Wh.	134,042	29	10.9	10	34.4			6			3				2	3			1					
" " .....Col	69,663	19	14.0	8	42.1			1					1			3								
Richmond, Va.....Wh.	38,024	10	13.5	1	10.0			2		1	1													
" " .....Col.	29,110	21	37.5	6	28.5			4					1				1							
Charleston, S. C.....Wh.	22,699	12	27.0					2						1		1	1	2						
" " .....Col.	27,537	18	33.8	7	38.8			3						1		2								
Atlanta, Ga.....Wh.	24,764	5	10.4	2	40.0					3														
" " .....Col	18,695	12	33.3	6	50.0			3		2						2							1	
*Savannah, Ga.....Wh.																								
" " .....Col.																								
Nashville, Tenn.....Wh.	31,086	10	16.6	6	60.0			2								1								
" " .....Col	18,848	10	27.6	2	20.0			2		1														
*Memphis, Tenn.....Wh.	18,677	12	33.3	3	25.0			4			1			1		1								
" " .....Col	14,896	14	48.4	6	42.8		1	2	1	2														
*Mobile, Ala.....Wh.																								
" " .....Col																								
New Orleans, La.....Wh.																								
" " .....Col																								
Total White	269,292	70	15.1	22	27.8			16		4	5			2	2	6	1	2	1					
Total Colored	178,749	94	27.0	35	37.2		1	15	1	5			2	1		7	1						1	
Total in 32 U. S. Cities	6,438,025	2,641	21.8	943	35.7	76	16	389	80	41	174	12	70	23	62	263	19	102	4	15	28	8	25	
Nov. 18—Total in 28 English Cities	8,469,571	3,668	22.0			109				69	30		82		140					115		9	65	
" " " 8 Scotch "	1,206,057	605	25.8			17				17	24		8		16					7			26	
Nov. 18 " 26 Irish "	843,553	418	25.8			3		42		8	2		4		11					14		1	4	

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Notes and Abstracts.

For the week ending Dec. 2, of a total urban population of 6,438,025, there died 2,641. Corresponding to an annual death rate of 21.3 per 1,000, a decided increase over the preceding week, in which it was 20.3 and on the average for the month of November, which was 20.4.

The lowest death rates for the week have been in the river cities, 16.6, and among the whites in Southern cities, 15.1. The increase in mortality is most marked in the North Atlantic and Eastern cities—and is due to diseases of the lungs.

Of the whole number of deaths 35.7 per cent. of the deaths were under five years of age. The relative mortality of young children was especially great in Albany, Brooklyn, and Hudson Co., N. J. Small-pox caused deaths in Philadelphia, Chicago, Pittsburgh and Minneapolis.

BOSTON, MASS.—C. E. Davis, Jr., Clerk, reports 52 cases of diphtheria, 30 of scarlet fever, and 12 of typhoid fever.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr Franklin reports five admissions, five discharges, three deaths, and 1,443 remaining under treatment.

PITTSBURGH, PA.—Dr. Snively reports four cases of small-pox, as reported during the week.

LOUISVILLE, KY.—Dr. Montgomery reports two cases of small-pox taken to hospital during the week; there are no cases in the city.

DETROIT, MICH.—Dr. O. W. Wight reports 31 cases of scarlet fever, and 55 of diphtheria.

HOLLISTON, MASS.—Dr. Hiram Sake reports the appearance of diphtheria.

SANDWICH, ILL.—Dr. Ballou reports the continuance of measles.

ROCK ISLAND, ILL.—G. G. Craig, Commissioner of Health, reports three deaths for the week ending Dec. 2. One from consumption, one from apoplexy, and one from brain disease.

PROVIDENCE, R. I.—Dr. E. M. Snow reports that during the week only 31 cases of typhoid fever were noted and of these only 10 began in that period. To date there have been 462 cases recorded with 65 deaths. The progress of the epidemic is shown by the following statement:

Week ending	*Mild.*	*Average.*	*Severe.*	*Total Cases.*	*Total Deaths.*
Nov. 4th	3	34	14	51	1
" 11th	46	69	48	163	10
" 18th	34	39	41	114	28
" 25th	22	53	28	103	14
Dec. 2d	10	13	8	31	12
Totals.	115	208	139	462	65

It is probable that all the cases which occurred have not been reported, as some were so slight or so modified as to be wanting in many characteristics of typhoid fever. It is certain that the disease is diminishing in prevalence and severity.

BALTIMORE, MD.—The number of deaths reported for the week ending Dec. 2, was 207, of which 77 were under five years of age and 40 were people of color. Taking the population as calculated from the United States census, which would be about 350,000, this would

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correspond to an annual death rate of 29.3 per 1,000. The Registrar reports the death rates as: whole population, 26.31; white 24.88; colored 34.67. The number of deaths from diphtheria during the week was 24; of small-pox, 25; consumption, 32; 14 from croup, 12 from pneumonia. The prevalence of zymotic diseases in Baltimore for the last month shows a very unsatisfactory condition of the public health. We regret to say that the Registrar, after consultation with the Health Officer, has formally refused to furnish a weekly report of deaths for THE SANITARY ENGINEER unless the editor would accept his estimate for the population and not change it, which as a matter of course is impossible.

MICHIGAN.—Dr. Baker's report for the week ending November 25, based on the observations of 48 medical men, in different parts of the State, shows the following diseases in the order of greatest area of prevalence: intermittent fever, rheumatism, bronchitis, neuralgia, consumption, influenza and tonsillitis. Influenza and diphtheria increased in their area during the week.

BALTIMORE, MD.—Dr. Jas. A. Stewart, Inspector, transmits report of his work at the port of Baltimore during the month of November. One thousand two hundred and thirty-four immigrants were inspected, of whom only 13 required vaccination, the others having been satisfactorily protected by the ship surgeons during the passage.

NEW YORK QUARANTINE.—During the week ending November 24, Dr. Hanor examined 6,405 immigrants, 87 of whom were vaccinated by him at the station. One case of small-pox was taken from the steamer "*Plato*," from Rio Janeiro, where the disease is prevailing. The crew of this vessel, 35 in number, were among those vaccinated.

ALLEGHENY, PA.—Dr J. H. Wright, city physician, sends report for the month of November. There were 119 deaths, 34 being under five years of age. Typhoid fever is prevalent, and diphtheria increasing. There had been no cases of small-pox. During the month 18 deaths were caused by typhoid, 10 by pneumonia, three by diphtheria, one by whooping cough and 19 by consumption.

TORONTO, CANADA.—Consul W. C. Howells reports the sanitary condition of the city as exceptionally good, since, during the week ending Dec. 2, there were 50 births, 54 marriages and only 15 deaths.

ONTARIO, CANADA.—The Health Bulletin of the province, for the week ending Nov. 25, shows the following diseases in the order of prevalence: neuralgia, bronchitis, influenza, consumption, anæmia, mumps and diphtheria.

VALPARAISO, CHILE.—Vice-Consul August Möller, Jr., reports 40 deaths from small-pox during the month of October.

WESTERRO, SANTA CATHARINA, BRAZIL.—M. W. Comsett, Consular Agent, reports, Oct. 2, the subsidence of the small-pox epidemic by the exhaustion of material susceptible to its influence. Since January there have been 141 deaths from small-pox in a total mortality of 345.

RIO JANEIRO, BRAZIL.—Consul Jas. H. Murray sends reports for the three weeks ending respectively Oct. 14, 21, and 28. Small-pox is increasing rapidly, and has been declared epidemic by the health authorities. During these three weeks there were 136 deaths from this disease, 29 during the first, 50 during the second, and 67 during the third.

CITY OF MEXICO.—Consul General David H. Strother reports, for the two weeks ending respectively Oct. 15 and 22: The total deaths were during the former 196, during the latter 171. The items are similar in both weeks. During the first, diarrhœa and dysentery caused 43 deaths, pneumonia and bronchitis 30, consumption 14. The city is free from zymotic diseases.

ENGLAND.—Vice-Consul-General Mitchell transmits the report of the Registrar-General for the week ending Nov. 18. The average mortality rate in the 28 great towns was 22.6 per mille, Birkenhead giving the lowest rate, 13.9; and Sunderland the highest, 30.7. The rate in London was 21.1. The 30 deaths from diphtheria included 21 in London. Small-pox caused four deaths in London and five in Newcastle-on-Tyne. In London there occurred also 78 deaths from measles, 68 from scarlet fever, 20 from whooping cough, two from typhus and 30 from typhoid fever.

IRELAND.—Consul A. B. Wood, Consul Belfast, transmits the Registrar-General's return for the week ending Nov. 18. The average rate in 16 large towns was 25.8. No deaths from measles, scarlet fever or small-pox occurred in Dublin. Two deaths from typhus are reported, one in Dublin and one in Waterford.

SCOTLAND.—The return of the Registrar-General for the quarter ending Sept. 30, shows 16,886 deaths, giving a ratio of 17.8 per 1.000. In the principal towns the ratio was 20.8; in the large towns, 19.8; in the small towns, 17.8; in the insular rural districts, 14.0; and in the mainland rural section, 13.7. Of the eight principal towns, Paisley had the highest ratio, 26.2; and Aberdeen the lowest, 17.5. In these eight towns there were 6,332 deaths, of which only one was caused by small-pox; diarrhœa caused 483, dysentery 10, typhoid fever 98, typhus 23, whooping cough 215, measles 115, scarlet fever 138, diphtheria 80, erysipelas 29 and consumption 744. About 32 per cent. of the inhabitants of Scotland reside in these eight towns, and experience has shown that the causes of death which are most frequent in them during a given period are likewise those which are most rife in the country at large.

SCOTLAND.—The return for the week ending Nov. 18 is given in abstract in our statistical table. The lowest mortality was recorded in Leith, 19.7; the highest in Paisley, 37.6. Of the 26 deaths from whooping cough, 19 were registered in Glasgow.

PARIS, FRANCE.—For the week ending Nov. 23, Dr. Bertillon reports 1,071 deaths, an increase of 69 over the preceding week, and corresponding to an annual mortality of 24.8 per 1,000. Of these deaths, 256 were of children under five years. Typhoid fever is diminishing, 79 deaths from this cause being reported in place of 120 the preceding week. There were 34 deaths from diphtheria, ten from small-pox, 11 from measles, five from whooping cough.

ST. PETERSBURGH, RUSSIA.—Consul Edgar Stanton reports, for the week ending November 4, 18 deaths from small-pox and 63 cases under treatment in hospitals. During the week ending Nov. 11 there were 25 deaths from this disease and 57 cases in the hospitals.

RHEIMS, FRANCE.—Consul John L. Frisbie, for the week ending Nov. 12, reports three deaths from measles in a total mortality of 48. With the exception of measles the city is free from zymotic diseases.

STOCKHOLM, SWEDEN.—Consul Nere A. Elfwing reports 67 deaths during the week ending Nov. 11. Scarlet fever caused four deaths, typhoid five, diphtheria one, consumption 16. No deaths are recorded from measles, small-pox, croup, or whooping cough.

BERLIN, PRUSSIA.—Consul General Brewer reports the prevalence, during the month of October, of typhoid fever, diphtheria and scarlet fever.

COPENHAGEN, DENMARK.—Consul Henry B. Rysen reports 89 deaths during the week ending Nov. 7, 39 being under five years. Of these two were caused by scarlet fever, one by diphtheria and one by croup. Physicians are required to report their *cases* of contagious and epidemic diseases. During the week there were 16 of measles, 28 of scarlet fever, five of diphtheria, three of croup, ten of typhoid fever, 71 of diarrhœa, 165 of bronchitis and 127 of tonsillitis.

ST. PAUL DE LANDA, AFRICA.—Consul Duverge reports, for the month of September, 30 cases of bilious or green fever with seven deaths, 28 cases of dysentery with six deaths, and 178 cases of small-pox, with 95 deaths. The last mentioned disease broke out early in the month and is spreading rapidly. Compulsory vaccination has been instituted and every effort is being made to check the progress of the epidemic.

MECCA.—The presence of the cholera among the pilgrims at Mecca, which was announced last week in communications from Constantinople and Jeddah, is reported, under date Nov. 9, by Consul W. A. Stevens, Smyrna, Turkey, who states that quarantine has been established on all routes leading from Mecca, as in 1881.

SMYRNA, TURKEY.—Consul Stevens also reports an outbreak of small-pox in Smyrna. The disease began about six weeks anterior to the date of his report, and has spread with such rapidity that new cases to the number of 300 daily are being reported. "Many have died of the loathsome disease."

BOMBAY, INDIA.—Consul B. F. Farnham reports that cholera is dying out in the presidency. In the city there was only one death from the disease during the week ending Sept. 26, and none during that ending Oct. 3. Remittent fever is prevalent, having caused 72 deaths in a total of 457 during the one week and 92 in a total of 446 during the other. Annual rates 27.23 and 27.10 respectively.

MADRAS, INDIA.—During the week ending Oct. 27 there were 284 deaths within the municipality, giving a ratio per 1,000 of 34.8. There were 66 deaths from fever, 41 from diarrhœa and dysentery, two from small-pox and two from measles. No deaths from cholera.

SINGAPORE, INDIA.—Consul A. G. Studer reports, for the month of September, 364 deaths in a population of 139,000. Remittent fever is prevailing extensively, but reported as of a mild type, yet 82 of the deaths were caused by it. Diarrhœa caused 50 deaths, dropsy 32, consumption 48, and small-pox one death. Scarlet fever, croup, diphtheria, whooping cough, and typhoid are absent from the record.

FOOCHOW, CHINA.—J. P. Cowles, Jr., Vice-Consul, Oct. 20, reports the European community free from sickness, although their hongs or houses are surrounded by the abodes of the living, and shallow graves of dead natives, while several thousands of boat populative are on the river above the settlement. The population of the city is reported as 500,000. The streets are narrow and filthy. In the centre of each, just beneath the flag stones, is a narrow drain for all sewage except night soil, which is carried at all hours in open buckets to the country and stored in tanks till required. Malarial diseases, anæmia and dyspepsia are prevalent. Among the natives, vaccination makes slow progress among them, and small-pox prevails every winter. Chicken-pox, measles, mumps, whooping cough, erysipelas, cancer, leprosy, and syphilis, are rife among them. Typhoid and typhus are epidemic, but cholera has not appeared since 1877, when it visited most of the other parts of China and Japan.

SWATOW, CHINA.—For the week ending October 7, Consular-Agent C. C. Wiliams reports eight cases of cholera among the natives, and six deaths from the disease. He notes the prevalence of malarial diseases, eye inflammations, leprosy, and elephantiasis.

COLOMBO, CEYLON.—The sanitary report for the month of October show the occurrence of 110 cases of small-pox, 17 of which were fatal. No other disease is prevailing.

SOURABAYA, JAVA.—Consular Agent Austen's cholera report for the twenty days ending Oct. 10, shows nine remaining sick from previous report, 274 taken sick, 53 recoveries, 224 deaths, and six remaining under treatment.

The Louisville *Medical News*, of November 25, contains a note by Dr. L. P. Yandell in which he says. "Malaria is *the chief source* of *acute* skin disease. Scrofula is *the chief source* of *chronic* skin disease. The more inveterate cases of skin disease are often due to the coëxistence of these two things. The specific exanthems, of course, are not included here, but I contend that their progress and termination are often largely influenced by the presence of malaria or struma. *I do not claim* that malaria and struma are the *sole* causes of the dermatoses. Indeed, *many* of the dermatoses may exist *independently* of *malaria* or *struma*, and most frequently some exciting cause is necessary to develop the cutaneous eruption. Among the exciting causes are irritants, injuries, insufficient or improper ingesta, vicissitudes of temperature, alcohol, dentition, menstruation, parturition, lactation, etc. The proofs of the truth of my views are, in the first place, that the diseases of the skin are cured more certainly and more quickly by the antimalarial remedies on the one hand, and by the antistrumous on the other, than can be done by any other line of therapeutics; and in the second place, that careful and painstaking investigation will, in the majority of dermatoses, make apparent the existence of the malaria or the struma, as the case may be."

[Precisely what Dr. Yandell means by scrofula we do not know, but presume he uses the term as a synonym for chronic skin disease.

It is also uncertain as to what he would include in the word malaria, but if it is to be confined to the cause of intermittent fever, we think that quite as much skin disease will be found in Boston, where there is no malaria, as in the Mississippi swamps, where there is plenty of it.]

Tables showing the number of new patients at seven New York City Dispensaries, for the week ending Dec. 2, 1882, with some of the principal acute diseases:

NAME OF DISPENSARY AND REPORTER.	Character of Disease.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Total.
New York Dispensary, Reported by Dr. Wm. A. Valentine.	Acute Diseases.	21	19	14	....	31	32	117
	Chronic Dis'es & Surg. Cases.	28	45	25	..	38	30	166
Demilt Dispensary, Reported by Dr. E. J. Dalken.	Acute Diseases.	12	26	13	2	21	34	108
	Chronic Dis'es & Surg. Cases.	42	35	22	5	52	41	197
Bureau Med. Relief, Dpt Char. and Corrections. Reported by Henry Savage.	Acute Diseases.	72	73	67	....	65	52	329
	Chronic Dis'es & Surg. Cases.	43	41	43	....	41	43	211
Northern Dispensary, Reported by W. B. Sinn	Acute Diseases.	17	13	16	15	11	6	78
	Chronic Dis'es & Surg. Cases.	12	9	19	27	6	7	80
Eastern Dispensary, Reported by Dr. S. S. Bogert.	Acute Diseases.	20	18	16	....	10	14	78
	Chronic Dis'es & Surg. Cases.	99	77	50	....	57	90	373
North Eastern Dispensary, Reported by Dr. W. Schoonover.	Acute Diseases.	46	37	36	7	41	49	216
	Chronic Dis'es & Surg. Cases.	30	31	30	5	28	34	158
North Western Dispensary, Reported by Dr. R. J. McGay.	Acute Diseases.	30	34	20	....	36	20	130
	Chronic Dis'es & Surg. Cases.	36	20	23	....	22	23	124
Total.....	Acute Diseases.	218	220	182	24	215	207	1066
	Chronic Dis'es & Surg. Cases.	290	258	212	37	244	268	1309

NAME OF DISPENSARY.	Total New Patients.	Under 5 Years.	Males.	Females.	Whooping Cough.	Malarial Fever	Diarrhœal Diseases.	Acute Lung Diseases.	Brain Diseases.
New York Dispensary	256	27	150	106	....	7	2	46	1
Demilt Dispensary... ...	305	43	129	176	7	10	4	62	1
Bureau of Med. Relief, Dept. Charities & Corr'c'n	517	57	266	251	7	52	11	134	10
Northern Dispensary.....	137	41	67	70	2	6	2	29	1
Eastern Dispensary	438	111	196	242	....	18	16	29	....
North Eastern Dispensary	374	49	179	195	4	16	9	76	....
North Western Dispensary	264	12	117	147	....	14	1	87	....
Total.....	2231	340	1104	1187	20	121	45	463	13

There are some discrepancies in the totals of these two tables, depending on discrepancies in the original returns, which it has been impossible to correct. They show that during the week 2,375 new cases were reported, of which 1,066 were of acute diseases, being a decrease from the preceding week. Thursday being a holiday, very few cases were treated on that day, and there was no corresponding increase on the following day—which accounts for the diminution. The proportion of malarial fever cases has increased, contrary to what might have been expected. Whooping cough has diminished, and the acute lung diseases have increased. Six cases of diphtheria, one of measles, one of scarlet fever, two of typhoid fever, and seven of tonsillitis, are reported.

The recent Imperial decree relating to the precautions to be taken against fire in the Vienna theatres enacts that all theatres built from this date are to be completely detached. The stage is to be divided from the auditorium by a wall not less than 20 inches high and 18 inches thick above the roof, so that in case of fire the stage may be isolated from the rest of the house. The stage must be of sufficient height for the curtain to be raised without being rolled. No one is to be allowed to live in the theatre, and the stage carpenter's shops, the stage appliances and the refreshment bars are to be outside the theatre, this latter regulation to be applied to theatres already in existence. All the dresses worn by the actors and actresses are to be dipped in a preparation which makes them more or less fireproof, and no explosive matter is under any pretence to be left in the theatre. Very strict provisions are made with regard to the seating of the theatre, so that there may be plenty of room for easy exit, and the prefect of police is to have the power of deciding how many firemen shall be allotted to each theatre.

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Construction Notes.

We shall always be glad to receive items of interest for this column.

WASHINGTON, D. C.—The following bids were opened at the office of Bvt. Maj. Gen. M. C. Meigs, at 12 M., Dec. 2, 1882, for the building materials specified for the fireproof building for the Pension Office:

Brick, common—Washington Brick Machine Co., $7.93 per thousand; Childs & Son & Jacob Childs, $7.23; W. H. West & Bro., $8.35.

Brick, pressed—Washington Brick Machine Co., $10.93 per thousand; Alex. Russell & Barnes, Russel & Co., $23; Childs & Son and Jacob Childs, $10.63.

Bricks, moulded—Washington Brick Machine Co., $9 per hundred; Alex, Russell & Barnes, Russel & Co., $50 per thousand; Jno. E. Herrell, $50 per thousand; do., $100; do., $170; do., $250.

Cement—S. P. Brown, round top, 43c. per cwt.; do., Rosendale, 48c.

J. G. & J. M. Waters, round top, $1 bbl. of 300 lbs.; Jas. M. McGill, 45c. per cwt., Rosendale; 75c. Portland; 85c. Eng. Portland; Lehigh Cement Co., 44c. per cwt., barrels; do., 47c., bags; J. M. Wheatly, 29c.

Lime—W. Cammack and G. W. Dickson, 41c, per cwt.; Richard McCoy, 34c. per cwt.; C. P. Maloney, $1.50 per bbl.; do. (1), 48c. per cwt.; do. (2), 44c. per cwt.; do. (3), 40c. per cwt.; Marshall & James, $1.25 per 300 lbs.; Jas. S. Walker, 40c. per cwt.; Jas. Wheatley, 37½c. per cwt.; R. C. Hewitt, 160 bbl., 45c. per cwt.; S. P. Brown, $1.24 per bbl.; do., 62c. per cwt.; do., 55c. per cwt.; do., 62c. per cwt.; M. E. Grady, 48c. per cwt.

Terra Cotta—L. I. Terra Cotta Works, $24,250; do., additional work, $3,600; A. Hall, Terra Cotta, $19.800; Alex. Russell, and Barnes, Russell & Co., $23,000; Perth Amboy Terra Cotta Co., $22,400.

Coloring Matter—James H. McGill, brick red, $1 per c.; brown, $1.75 do.; mixed, $1.50 do.; metal red, $1.75 do.

Awards have been made thus far as follows:

Wilson & Son, laying rubble stone masonry, $1.49 per cubic yard.

J. M. Wheatly, Cement, 29c. per 100 lbs.

Richard McCoy, Riverton, Va., Lime, $1.02 per bbl., of 300 lbs.

Barnes, Russell & Co., Baltimore, Md., Molded Brick, at $50 per 1,000.

Same firm, Pressed Brick, at $23 per 1,000.

J. H. McGill, Coloring Matter for mortars, at $1 to $1.75 per 100 lbs.

Robert M. Miller, Sand, at 97½c. per cubic yard.

Boston Terra Cotta Co. The terra cotta as per detailed drawings and specifications, $16,038. For additional proposed terra cotta work as per schedule and proposition with bid, $15,442

For Spandrils, also additional, $900.

MOBILE, ALA.—The bids for dredging Pensacola Bar were opened Dec. 1. Geo. C. Forbes & Co. bid 95 cents per cubic yard; P. F. Nouvet, 83⅓; S. N. Kimball, 79 1/10.—*Picayune.*

NEWPORT, R. I.—A plan has been submitted to the New Asylum Committee by James Fludder, architect, for four new buildings for the City Asylum. The total cost, including plumbing and steam fitting, is estimated at $49,000, of which $11,000 is for the lot on which the buildings will stand.

WASHINGTON, D. C.—The contract for erecting fire escapes at the Government Insane Asylum and Government Printing Office have been awarded to Mr. W. S. Chew and C. A. Schneider, both of Washington, D. C., by the Commissioners appointed by Congress, consisting of Gen. Meigs and Architects Clark and Hill.

Mr. Chew's contract calls for the erection of four stand pipes at the Printing office and five at the Insane Asylum. Each to have connected at bottom with underground water pipes and at or near the surface for connecting two street fire engines. Outlets for hose to be placed at each story and on the roof.

Mr. Schneider's contract is for exterior iron staircase opening from domitory at the asylum and three in the courtyard of the printing office. The necessary underground pipes to stand pipes will be included in Mr. Chew's contract. Estimated cost of this work will be about $5,300 under the contracts.

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Affidavit to the above effect in New York Papers of November 18th, 1878.

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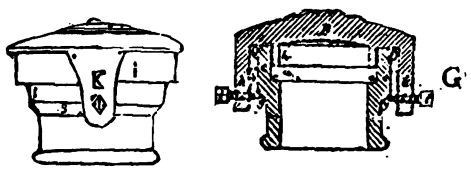
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

263,448. SEWER INDUCT AND ITS COVER. JOHN F. WITHEY, Lynn, Mass. Filed June 14, 1882. (No model.) Issued Aug. 29, 1882.

Brief.—The screws in the ears of the flanged cover operate against an annular bevel on the pipe, holding it in place.



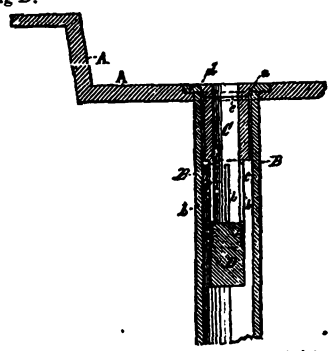
Claim.—1. The sewer induct or pipe provided with the annular bevel, in combination with the cap arranged on the said pipe and provided with the screws to operate against such bevel, as set forth.

2. The cap having the two concentric flanges and the ears and screws, arranged with it as described, in combination with the pipe, having the chambered enlargement, and the annular bevel, to operate with such flanges and screws, as explained.

3. The cap having the two concentric flanges and the ears and screws, arranged with it as explained, in combination with the induct or pipe having the chambered enlargement and its flange and annular bevel, arranged as shown and described.

263,696. WATER SINK. WILLIAM J. GRANLEES, Philadelphia, Pa. Filed Dec. 29, 1881. (No model.) Issued Sept. 5. 1882.

Brief.—The strainer C is detachable, and is of diminished diameter at its lower end, which is slotted, and which is provided with the weighted plug D.

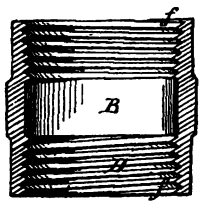


Claim.—1. The detachable receiver C, of diminished diameter at its lower end, and having vertical slots *b*, and the screw plug, D, substantially in the manner described and for the purpose specified.

2. The receiver C, having a flange, *d*, at its upper end and openings at its lower end for the passage of water into the discharge pipe, and the plug D, which performs the double function of closing the lower end of the receiver and of acting as a weight to keep the flange *d* in close contact with the bottom plate of the sink, substantially as described.

3. The combination of the receiver C, having a flange, *d*, plug D, and slots *b*, with the sink A and discharge pipe B, the lower end of the receiver being reduced in its diameter to form an annular space, *c*, and a wire *e*, or other suitable device to be used in lifting it, substantially as described.

263,948. WROUGHT-IRON COUPLING FOR PIPE SECTIONS. JAMES O. MORSE, ENGLEWOOD, N. J. Filed Feb. 21, 1882. (No model.) Issued Sep. 5, 1882.



Claim.—A wrought-iron coupling ring composed of a central interior groove or recess and tapered screw threads extending from the ends of the ring to the edges of the groove, substantially as and for the purpose described.

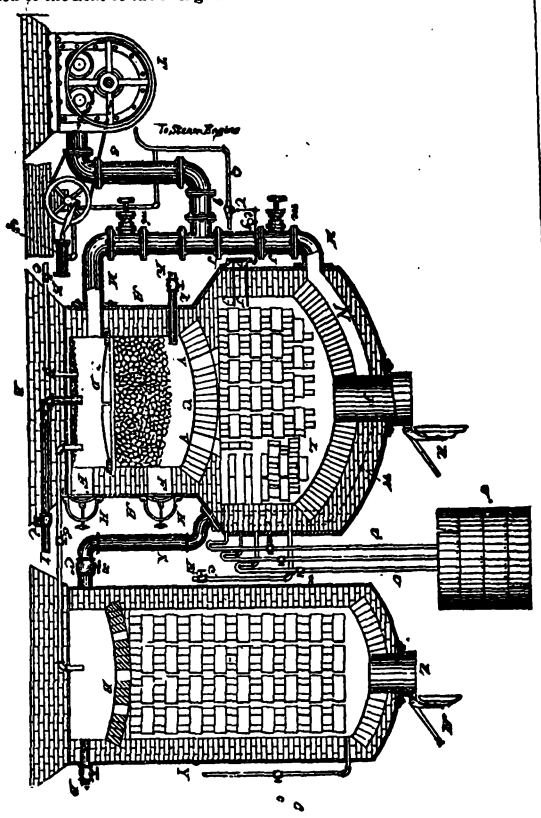
263,984. PROCESS OF AND APPARATUS FOR THE MANUFACTURE OF GAS. THEODORE G. SPRINGER, New York, N. Y. Filed Aug. 14, 1882. (No model.) Issued Sep. 5, 1882.

Claim.—1. The process of manufacturing gas consisting of the following steps, to wit: raising a body of carbonaceous material to an elevated temperature or an incasdescent state by means of a blast of air, burning the products of combustion above the same, stirring the resulting heat at a comparatively low temperature in a large body, then decomposing steam by passing it through the highly-heated carbonaceous material, and finally fixing the resulting gases and the vapor of liquid hydrocarbon at a more moderate temperature, whereby the burning or decarbonization of the fixed gas is prevented, substantially as specified.

2. In an apparatus for generating gas, the combustion and generating chamber, and the fixing chamber communicating therewith, the generating chamber being of suitable dimensions for decomposing steam, and the fixing chamber of larger lateral dimensions, whereby the depth of carbonaceous material to form the carbonic oxide necessary for heating is provided for and the proper distribution of the fixing material to prevent destructive decomposition of the oil, vapor, or gas is obtained, substantially as specified.

3. In combination with the fixing chamber of the cupola, the gas eduction pipe leading therefrom, the exhauster and a steam engine for running the same, a thermostatic regulating device connected to the fixing chamber and to a valve in the steam supply pipe connected to the engine, whereby the speed of the exhauster is controlled by the heat of the fixing chamber, and the gas is properly fixed without destructive decomposition or decarbonization.

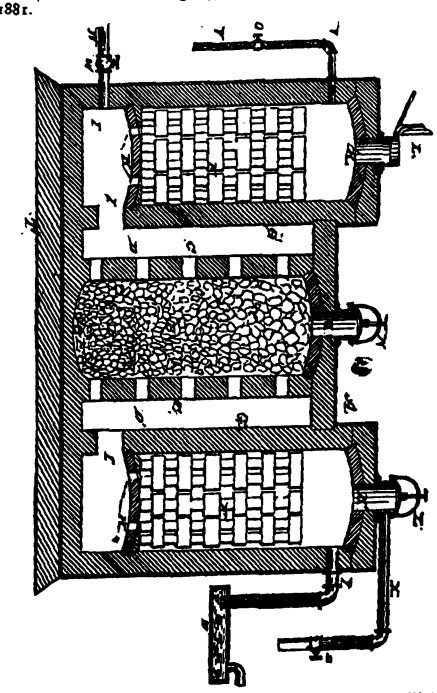
4. In the manufacture of illuminating gas, the process of uniformly combining and fixing the water gas and hydrocarbon vapors and preventing destructive decomposition or decarbonization of the hydrocarbons, which consists in automatically withdrawing the gas faster or slower from the fixing chamber, and thus retaining it for a shorter or longer period in contact with the heated fixing material in proportion to the heat of the fixing chamber.



5. The combination, with the fixing chamber and the combustion chamber and generator of the apparatus and the air, steam, and oil supply pipes, of the exhaust pipe and the exhauster, arranged to operate substantially as specified.

6. In a gas generating apparatus, the combination of a generating chamber containing carbonaceous material, and a connected fixing chamber containing refractory material, the fixing chamber being greater in transverse area than the generating chamber, whereby the steam is compelled to pass through a sufficient body of carbonaceous material to be thoroughly decomposed into carbonic oxide and hydrogen, and the resultant gases are diffused laterally to a greater extent than the lateral passage of the steam, so as to decompose the liquid hydrocarbon, and at the same time prevent destructive decomposition of the gas, substantially as specified.

263,985. PROCESS OF AND APPARATUS FOR THE MANUFACTURE OF GAS. THEODORE G. SPRINGER, New York, N. Y. Filed Aug. 14, 1882. (No model.) Issued Sep. 5, 1881.



Claim.—1. The process of generating water gas and utilizing the heat of the gas for heating air and superheating steam, which consists in first raising to incandescence a body of carbonaceous material by a blast of air and burning the resulting hot products of combustion by an air blast and storing the heat in a body of refractory material superheating steam by passage through such refractory mareria, then decomposing such steam by passing it through the incandescent fuel and passing the resulting hot gas through a body of refractory material and storing the heat, at the same time cooling the gas, continuing the operation until the fuel is reduced below the decomposing temperature, then heating a blast of air by passage through the last-mentioned refractory material and forcing such air through the carbonaceous material for again raising it to incandescence, and burning the resulting gaseous products and storing the heat in the steam-superheating body of refractory material, as at first, and thus continuing the operation.

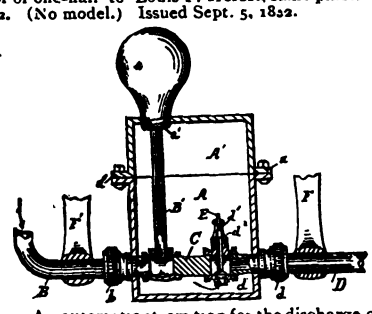
2. The process of generating gas, the same consisting in passing steam, superheated or otherwise, through a column or body of incandescent carbonaceous material at different heights, drawing off the resulting gases at different elevations, and renewing the carbonaceous material as it is consumed, whereby gases of different qualities—that is, poorer and richer gases—are simultaneously carried off and mixed together, forming a homogeneous gas.

3. The combination, in a gas-generating apparatus, of a generator having horizontal tuyeres and eduction passages at different elevations, and one or more heat-storing chambers connected with the generator by means of flues, and suitable means for admitting or forcing air and carrying off gas, substantially as specified.

4. The combination, in a gas generating apparatus, of a generator having horizontal tuyeres and eduction passages at different elevations, and one or more heat storing chambers connected with the generator by means of flues, and suitable air and steam supply pipes and gas eduction pipes, and act feed-magazine located above the generator, the generator being provided with an aperture at the bottom, through which the ashes may be run off as slag to make room for fresh material, which is fed automatically by the magazine, substantially as specified.

5. The combination, in a gas generating apparatus of a generator having one or more tuyeres and one or more eduction passages, the heat storing and superheating chamber F, having connecting steam and air pipes and an escape flue for waste products of combustion, the heat-storing and air-heating chamber F [1], having the connecting gas eduction pipe and air supply pipe, and suitable connecting flues, for the purpose described.

263,716. STEAM TRAP. JOHN MOREHEAD, Detroit, Mich., assignor of one-half to Louis F. Herbst, same place. Filed July 11, 1882. (No model.) Issued Sept. 5, 1882.



Claim.—1. An automatic steam trap for the discharge of condensed water from steam pipes, consisting of a suitable receiving chamber, an inlet steam pipe which traverses the chamber at one side of the centre of gravity and constitutes an axial support upon which the receiving chamber may be tilted, an interior pipe connected therewith and carrying the steam above the water in the chamber, a discharge pipe having its valve within said chamber, a lever arranged within said chamber and adapted to hold the valve closed when the receiving chamber is in a horizontal position and leaving it free to operate when said chamber is tilted out of such position, and in combination therewith means whereby it shall be caused to occupy a horizontal position when relieved of its surplus water, substantially as described.

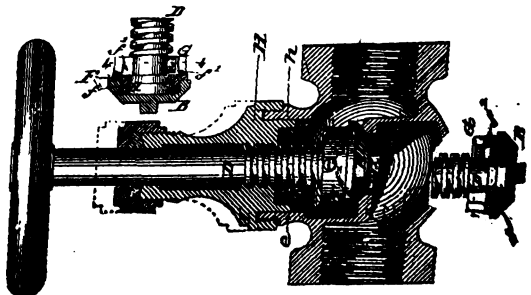
2. An automatic steam trap for the discharge of condensed water from steam pipes, consisting of a suitable receiving chamber, an inlet steam pipe traversing said chamber at one side of the centre of gravity and forming a limited axis therefor, and interior pipe connected therewith adapted to carry the steam above the water in the receiving chamber, a discharge pipe provided with a suitable interior valve and valve stem, a lever constructed and adjusted to rest upon the valve-stem when the receiving chamber is in a horizontal position and to release its pressure upon the valve-stem when the receiving chamber is tilted out of said position, and in combination therewith means whereby said chamber shall be caused to occupy a horizontal position when relieved of its surplus water, the whole construction being such that when the water unduly accumulates in the chamber it will tilt said chamber, relieve the valve from the pressure of the lever, and permit the pressure of the steam upon the water to open the valve and discharge the water until the equilibrium of the chamber is restored, substantially as described.

3. An automatic steam trap for the discharge of condensed water from steam pipes, consisting of a suitable receiving chamber provided with a cock and weighted lever, an inlet steam pipe, an interior pipe connected therewith adapted to carry the steam above the water in the receiving chamber, a strainer below the orifice of said pipe, a discharge pipe provided with a suitable valve connected by a blank joint to the inlet pipe, said valve provided with a valve stem, a lever constructed and adjusted to rest upon the valve-stem when the receiving chamber is in a horizontal position and to release its pressure upon the valve when said chamber is tilted out of such position, and in combination therewith suitable stuffing boxes whereby the receiving chamber is pivoted upon the inlet and discharge pipes, substantially as described.

4. An automatic steam trap for the discharge of condensed water from steam pipes, consisting of a suitable receiving chamber provided with an air chamber, cock and weighted lever, an inlet steam pipe, an interior pipe connected therewith adapted to carry the steam into the air chamber, a discharge pipe provided with a suitable valve connected by a blank joint to the inlet pipe, said valve provided with a valve-stem, lever constructed and adapted to rest upon the valve-stem when the receiving chamber is in a horizontal position and to release its pressure upon the valve, when said chamber is tilted out of such position, and in combination therewith suitable stuffing boxes whereby the receiving chamber is pivoted upon the inlet and discharge pipes substantially as described.

5. In a steam trap for the discharge of condensed water from steam pipes, a suitable receiving chamber provided with an air chamber, said air chamber provided with a strainer, substantially as described.

264,087. VALVE. JAMES JONES, St. Louis, Mo. Filed June 6, 1882. (No model.) Issued Sept. 12, 1882.



Claim.—1. The combination of the valve E, the collar F, having the flange f^1, the stem D, the screw G, the collar H, the cap I, and the valve chamber E, substantially as described.

2. The combination of the chamber E, the cap I, the collar H, having the flange *h*, and the stem D, substantially as described.

263,988 ELECTRIC ARC LAMP. JEAN AUGUSTE MONDOS, Neuilly, Seine, France. Filed Jan. 6, 1882. (No model.) Patented in France Nov. 11, 1881. Issued Sep. 5, 1882.

263,944. PUMP. PHILIP A MYERS, Ashland, Ohio, assignor of one-half to Francis E. Myers, same place. Filed June 22, 1882. (No model.) Issued Sep. 5, 1882.

263,975. ROTARY PUMP. AUGUST SIEGRIST, Buffalo, N. Y. Filed Nov. 12, 1881. (No model.) Issued Sep. 5, 1882.

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The following are a few of the many articles of permanent interest:

A review of town sewering in England, with opinions on the question of small *versus* large sewers, or the combined *versus* the separate systems, by Robert Rawlinson, C.B, Chief Engineer, Inspector Local Government Board, England.

A report on the Sewerage of Concord, by Edw. S. Philbrick, C.E., instructive to town authorities generally.

Remarks by John S. Billings, Surgeon, U. S. Army, before the Academy of Medicine, New York, on sewer gas and the value of modern methods for excluding it from houses. This article throws considerable light on a question generally misunderstood.

Electric Lighting; its Fire Risks and their Remedies. Two articles by Prof. Henry Morton, President Stevens' Institute of Technology, Hoboken, New Jersey,

Illustrations, with description of the Arrangements for Heating and Ventilating the Bridgeport School House (intended to be a model building).

A continuation of Dr. J. S. Billings' Letters to a Young Architect on Ventilation and Heating, with illustrations of notable buildings.

A continuation of the "Sanitas" articles on Plumbing Practice (illustrated). Interesting to architects, builders, and plumbers.

Steam Fitting and Steam Heating, by "Thermus," a series of practical articles (illustrated), of great value to steam fitters and architects.

Illustrated Descriptions of notable jobs of Plumbing Heating, and Ventilating in Private Residences in the United States, including those of Mr. W. H. Vanderbilt and Mr. R. H. Bishop, of New York.

A series of articles on Petroleum Legislation in the United States, by E. G. Love. Ph. D.

A Report to the Greenock Board of Police on the Ventilation of the Sewers of Thirty-three Towns in England, compiled from information received from City Engineers, by Alex. J. Turnbull, C.E. Valuable to engineers and health officers.

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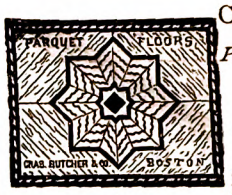

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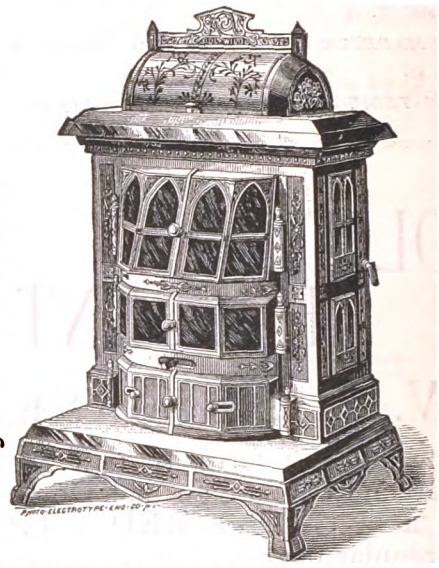

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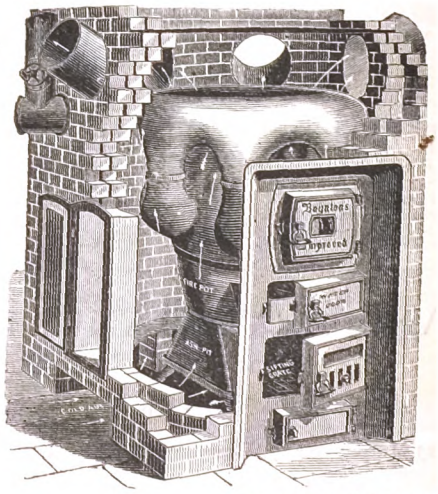

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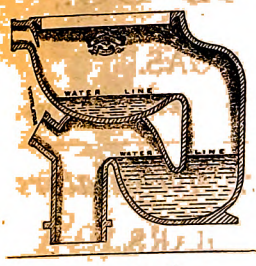

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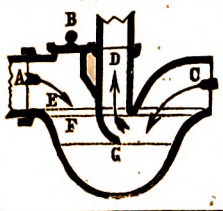

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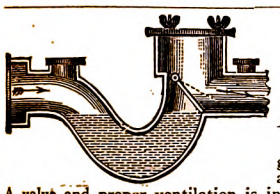

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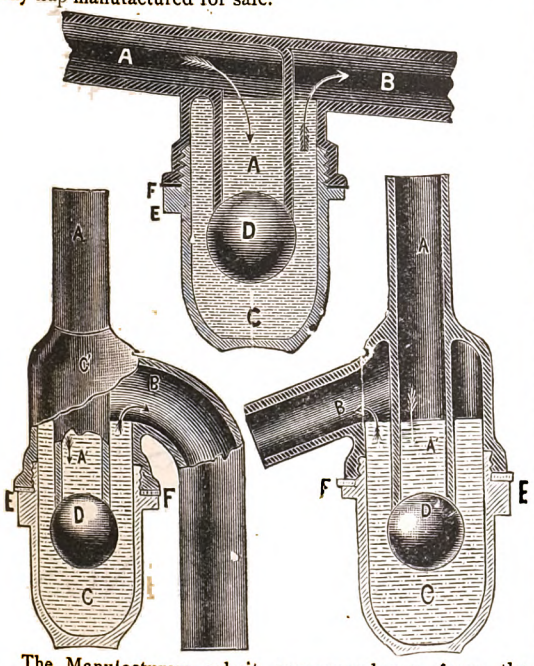

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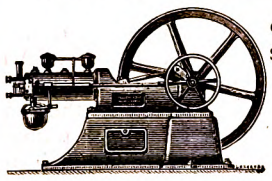

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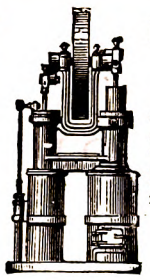

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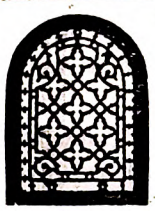

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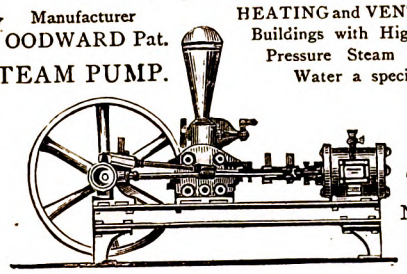

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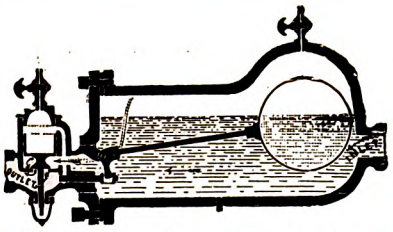

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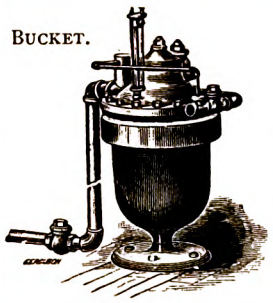

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Automatically drains the water of condensation from HEATING COILS, and returns it to the boiler, whether coils are *above or below* the water level in boiler, doing away with pumps and other mechanical devices for such purposes.
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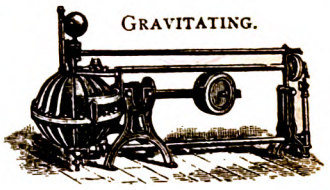

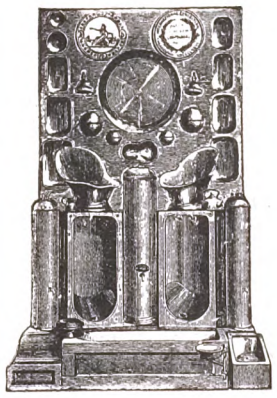

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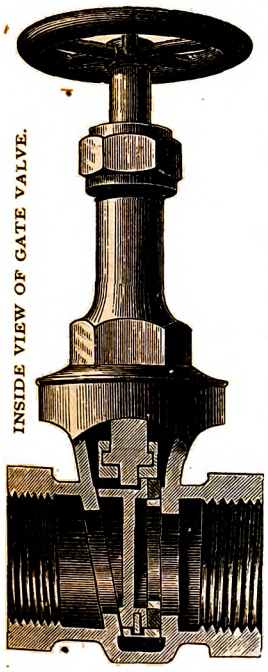

The advantages these valves possess over all other gate valves, are—

1st. They do not depend on a metallic disc for a joint, but use the Jenkins' Compressible Packing.

2d. As the disc of packing wears, the inclined follower (or metal seat.) keeps the disc to its seat, making a perfect joint.

3d. Should the discs give out at any time, they can be replaced very quickly, and at a small cost.

4th. They do not have to be taken from their places to be repaired.

5th. When the valves are only partly open. steam rushing through does not come in contact with the disc, so that it is impossible for the steam to wear holes through it or cut it out, as is too commonly the case with metal disc valves.

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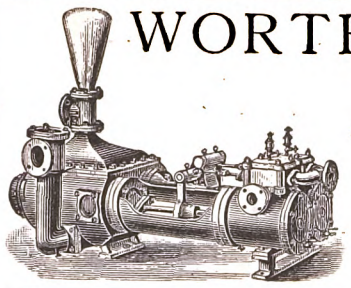

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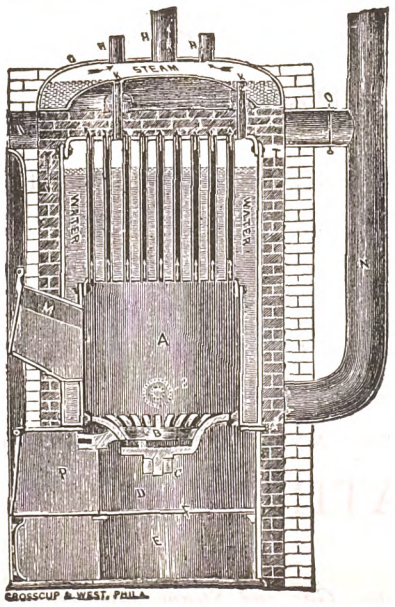

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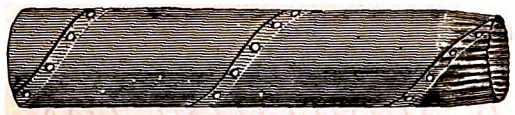

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Of Galvanized Iron, Tin, Copper, etc.,

Air-tight Seams, Handiest Coupling.

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The Original and most Reliable
SANITARY WATER CLOSET
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200 VINE STREET.
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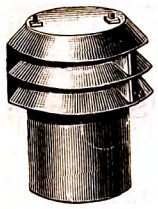
The Angle Ventilator



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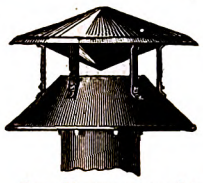

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13 different styles—adapted and warranted for every possible situation.

ESSENTIAL FEATURES.

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2d. By this system the chilling of the hot water in its passage to the top of the boiler is avoided.

3d. Hot water being stored at the top of the boiler without chilling, it can be used immediately; thus making the boiler serviceable as soon as the water-back is heated.

4th. The circulation is positive in direction and rapid in action, and heats in very much less time.

5th. Circulation being positive, there is no cracking, snapping or rumbling in the boiler.

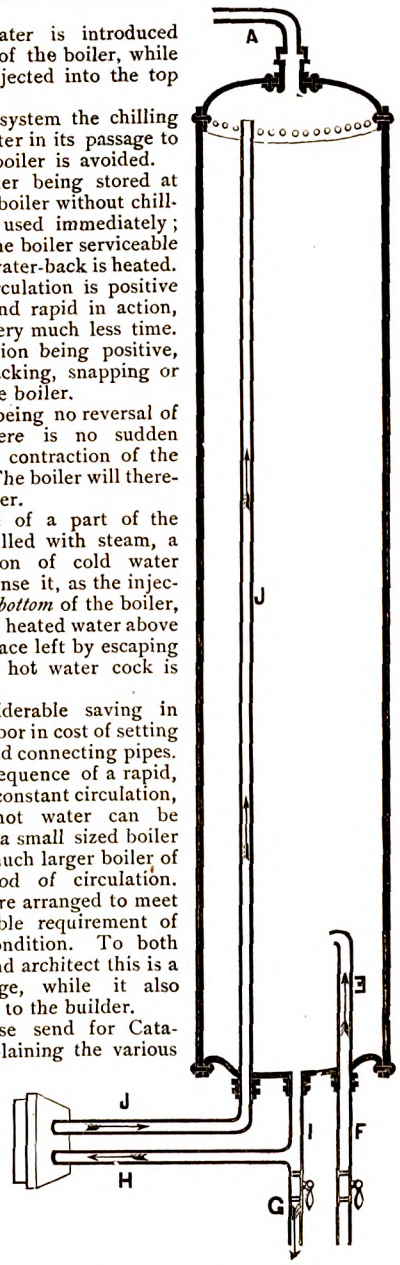
6th. There being no reversal of circulation, there is no sudden expansion and contraction of the boiler shell. The boiler will therefore wear longer.

7th. In case of a part of the boiler being filled with steam, a sudden injection of cold water does not condense it, as the injection is at the *bottom* of the boiler, thus forcing the heated water above it to fill the space left by escaping steam, when a hot water cock is opened.

8th. A considerable saving in material and labor in cost of setting up the boiler and connecting pipes.

9th. In consequence of a rapid, invariable and constant circulation, much more hot water can be obtained from a small sized boiler than from a much larger boiler of the old method of circulation. These boilers are arranged to meet every conceivable requirement of location or condition. To both the plumber and architect this is a great advantage, while it also lessens the cost to the builder.

N. B.—Please send for Catalogue fully explaining the various situations for which these boilers are intended.



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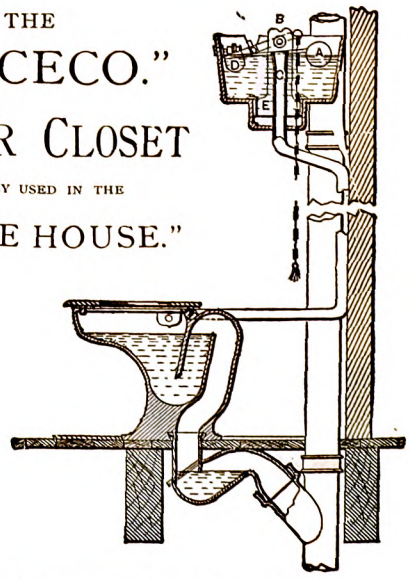

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THE BRIGHTON.

There is a tendency in some quarters to demand a Hopper form of Water Closet and to dispense with what are called mechanical parts. This would be desirable, if the so-called mechanical parts did not secure advantages in the matter of a large body of water in the bowl, not otherwise obtainable, without resorting to methods not everywhere applicable or sufficiently demonstrated as practicable.

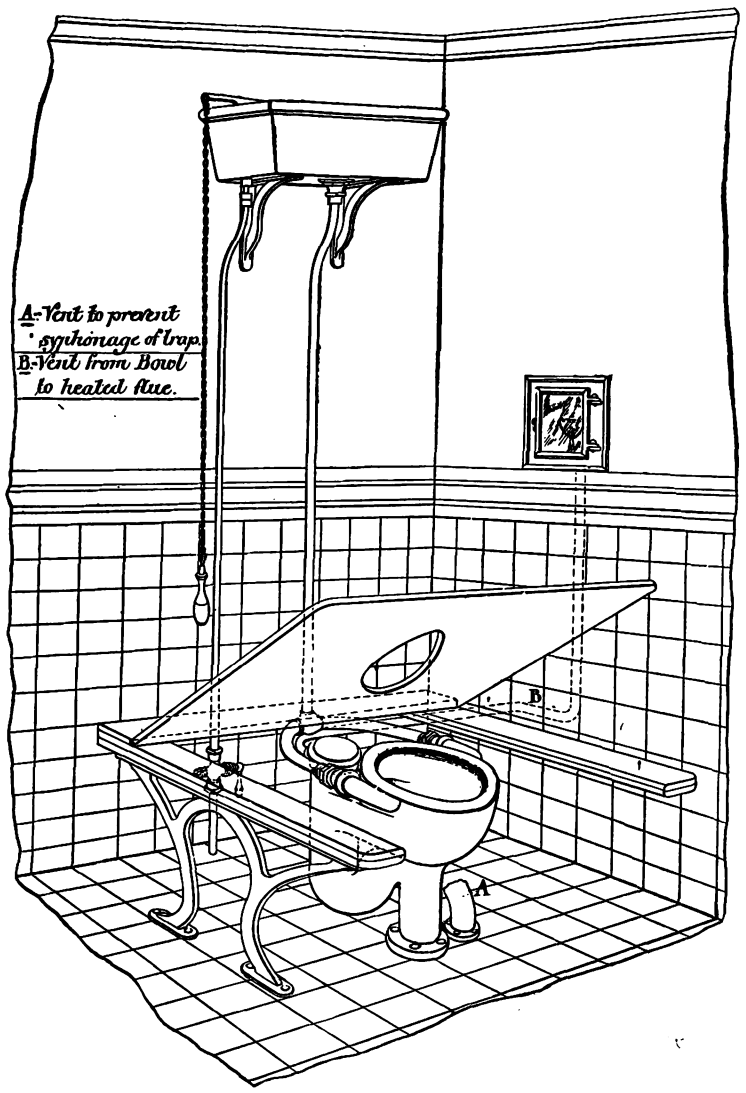
The Brighton Closet here illustrated is, we believe, the best compromise yet devised between the Hellyer form on the one hand and the Hopper on the other.

By examining the sectional cut, it will be seen that the bottom of the bowl is covered with water, while the flush and shape of the bowl is such that the trunk on the back is kept clean.

It is attractive in appearance, being all in one piece, of white earthenware.

The pipe *B*, connected with the trunk, can be run into a heated flue when desired.

These Closets have had a large sale in England during the past four years. We have had them in use in our factory nearly two years—and we now offer them to those who prefer a different form of Water Closet than the *Hellyer, which, by the way, does not, in a single instance, so far as we know, fail to satisfy those who have them in use.*



This will be known as

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The only Perfect Ventilated Hopper made.
Recommended by the highest Sanitary Authorities in the United States.

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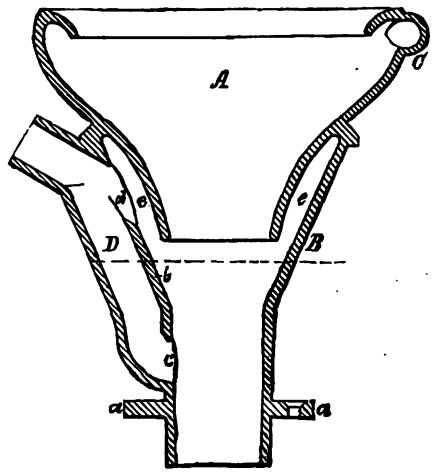
PATENTS APPLIED FOR IN CANADA.



SECTION.

The above cut represents a section of our Patent Ventilating Hopper. *A* is the basin projecting into the lower chamber *B*, leaving the space *e* between each. *D* is a ventilation duct at the side, having openings into the lower part of the hopper at *c* and into the upper part at *d*. Connection being made with *D* to a pipe leading to the outer atmosphere, an outward draft is thus created, removing all foul and offensive odors through the openings *c* and *d*. When the Hopper is flushed the rush of water forces the air in *B* into the duct *D*, making doubly sure the complete removal of all obnoxious gases.

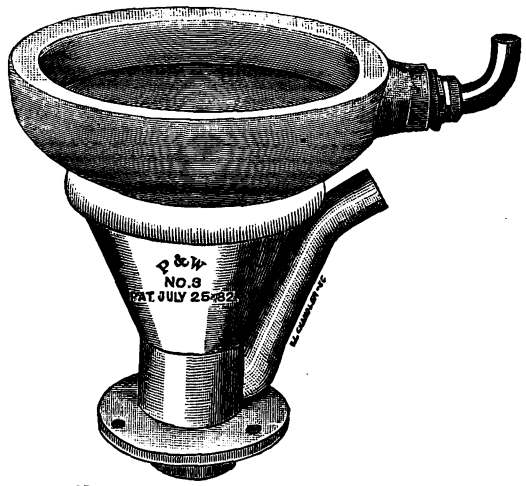
The advantages of this over the ordinary Water Closets in use are easily seen :—

Complete Ventilation.

Constructed in one solid body of crockery, there are no putty joints to absorb obnoxious gases.

They are thoroughly cleaned every time water is used.

No metals being employed, oxydization cannot take place, and so form a rough surface for filth to adhere to.



No. 3 VENTILATED HOPPER.

This is designed for tank supply only, being furnished with a flushing rim which thoroughly washes every part of the hopper. It is furnished with a brass connection for supply, so that *no putty is required*, a perfect joint being made.

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British Subscribers who wish to receive this paper without interruption should renew their subscriptions a month before expiration, with Messrs. E. & F. N. Spon, London, in order that they may be able to notify the Publisher, in New York, of the fact.

RIVER POLLUTION.

Under the above heading the *Westminster Review* for October contains an article by U. A. Forbes, which relates the troubles of the inhabitants of the lower Thames valley caused by the large discharge of sewage into the river from London and the metropolitan district.

The picture drawn is a gloomy one, and the remark of the Chairman of the Committee of the Metropolitan Board of Works, viz., "We have got rid of our sewage and with the sanitary aspect we have nothing to do," is quoted as illustrating the spirit in which the matter is viewed by the London authorities. Mr. Forbes thinks that in its legislation on the subject Government has begun at the wrong end of the question.

"When by the Public Health Act it established the system of sewer drainage, it prescribed down to the minutest details as to sewers, traps, flushing sewers, etc., all that it required local authorities to do in order to carry it out. Now that that system, after great expense and labor has been perfected and found to be unworkable, it, without help or warning of any kind, calls on these same authorities to find out some other mode of dealing with the question."

This does not seem to us to be by any means a fair statement of the case. The Government has shown how the house ends and the general system of sewerage may be arranged so as to avoid danger to health. It has not shown how the sewage can be best finally disposed of, though it has forbidden its disposal so as to contaminate water supplies. Since the best method of disposal of sewers varies in individual cases, it is pre-eminently a local question, to receive a special solution in each locality.

This is by no means equivalent to saying that each locality should be the final judge as to how it shall dispose of its sewage. But until some changes are made in the present organization and relations of the Local Government Board, one of the most important of which would be a change in its present Chief, it would not produce any good results to increase its authority in this or other matters.

Our attention was called to the following advertisement in a daily paper:

"A SITUATION WANTED—BY A YOUNG MAN AS Porter; understands plumbing and gas fitting; a handy man around hotel, or as watchman."

It is just such handy men that in attempting to do plumbing sometimes cause a great deal of trouble. If this advertiser was a good plumber he could earn from three to three and a half dollars a day. A porter's wages are about two dollars; the advertisement therefore implies that he is a better porter than plumber.

The average hotel plumber is a dangerous man to have around, and if the registration provisions of the plumbing law were strictly enforced in this city these men would be prevented from tampering with work that none but a skilled plumber should touch. If the plumbing societies want to perform a real service they should appoint a first-class committee which should make it its business to look after men not registered, and see that the law is carried out. The medical societies are constantly hunting out the frauds and quacks, and they are vigilant in seeing that the law for such cases is enforced. This is what reputable plumbers should do.

Our representative who was sent to verify another case of flagrant violation of the plumbing law reported by Inspector Hollick last week reports as follows:

The following defects were found in the six houses on the north side of 94th street, beginning about 100 feet east of Lexington avenue (James H. Havens, Jr., owner; McDougal, plumber, of 198 East 74th street). Traps on basin and sink wastes improperly ventilated, the air pipes starting not from the crown of the trap but at a considerable distance away, in some cases two or three feet, where the waste was nearly horizontal. The object was evidently to save pipe. In one case the wastes from two basins in adjacent rooms had a common air pipe which started from the pipe below the junction of the two.

Iron ferrules used instead of brass on the smaller connections between lead and iron pipes.

T-branches on the iron house drain receive a part of the smaller wastes. The rain leaders are not trapped.

In the six houses on the south side of 97th street 300 feet west of Second avenue, in which the same man, McDougal, did the plumbing, there were T-branches as in the others, the house drain was much out of alignment, and the T for the fresh air inlet was on the side of the pipe in a horizontal position. The name of Samuel Simmons appears as the owner, although Budenseick is recognized as the builder.

It was stated at the Board of Health that the plumber, Lamarche, paid no attention to the notices of the Board directing his removal of the violation consisting of open hubs and unventilated water closet traps (described in THE SANITARY ENGINEER of Dec. 7) until the matter was put in the hands of the attorney. On the second day thereafter a workman was found making the connections.

It is gratifying to be able to state that the Board are beginning to realize that nothing short of vigorous measures will do when dealing with mechanics of this class. We hope they will soon decide to test the question of their power to prevent these men from doing plumbing work in this city. The law was intended to give them such power and we believe it does.

Since the foregoing was written, we learn that a warrant has been issued for the arrest of McDougal.

The London *Morning Post* of October 31 gives a glowing description of the new City of London school just finished, at a cost of over $500,000. The marble staircases, pillars and mosaics, stained windows, and gilded tablets are dwelt

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upon but the ventilation is dismissed with the remark that "it seems to be perfect." It ought to be when we are told that the great hall, measuring 100 x 45, is to hold 800 people. That is, each person is to have less than six square feet of floor space. We fancy it would be very safe to wager that the ventilation will be very far from being perfect, and that the marble and stained glass and gilding will do very little to prevent the evil results of impure air. We should be glad to know what Dr. Abbott, the principal, thinks of this about the end of January next.

The smells of Bellevue Hospital grow with their years, according to the report of the visiting committee to the State Charities Aid Association. The plumbing is bad and the pavilion is a battle-ground for rats and mice. A plan adopted, after urgency by the visitors, for improving the plumbing by isolating it in towers has only succeeded so far as to produce the comment by them that "we doubt if any architect ever succeeded in spending so much money with results so absolutely inconsistent with decency and convenience." Whether the architect carried out his own ideas or those of the managers of the institution, the report throws no light on. The visitors again recommend a plan for the same object, specifying in detail the results to be secured. It is evident that they are on the right track, and it is also evident they should have employed expert services in compiling this technical portion of their report, which is now too obscure to be of much use to anyone. That portion of their report which will undoubtedly most interest and gratify the general public is the almost unqualified praise which they give to the success of the movement to establish a training school for nurses at Bellevue. Begun with doubts as to its success, and in face of certain strong popular prejudices, to-day the visitors feel authorized to say that had "the committee initiated no other work since its organization, ten years since, its members could feel that they had done much to justify their existence and entitle them to commendation."

The special examination by the Health Department, of the plumbing in the private schools of Brooklyn, now in progress, is likely to result in great good. Over 150 schools have been inspected, and many found in bad condition. The proprietors of all of the latter receive notice to correct the defects at once. Health Commissioner Raymond proposes to have the plumbing in all the private schools of the city in good condition by the end of the holiday vacation. His report of this examination will be an interesting document, which we hope to present to our readers before long.

THE NATIONAL BOARD OF HEALTH.

The following is from the *Nation* on the present position of the National Board of Health:

"One of the most remarkable examples of contemptuous disregard for the public good is the Congressional action that has placed the National Board of Health in a state, practically, of suspended animation. In 1879 this Board was organized by law, in response to vigorous appeals from sanitarians. It was charged with advisory functions in regard to the public health, and with coöperation, so far as was legal, with local boards against the introduction of foreign disease. This latter duty was required by a special law, known as the Quarantine Act, that expires by limitation in 1883. The dual form of government, the jealousy of State authorities, and the extreme repugnance of commercial communities to restrictive measures that affect their particular interests, made protective expedients very difficult to devise and carry out. And, indeed, it is only through local authority that any positive work can be done. Notwithstanding these obstacles, the National Board succeeded in limiting the spread of epidemic diseases without materially interfering with traffic—notably when yellow fever threatened the Mississippi Valley—as had never before been done. In its advisory capacity it set on foot important investigations as to certain preventable diseases, with very encouraging prospects; it practically suppressed the small-pox of immigration that threatened the North-west; and it accomplished the whole within the moderate appropriations with which it was endowed But in some way friction, especially with the Louisiana Board, was generated; an undertone of complaint not yet vented in open charges has been heard in New England; objection was made on the floor of the House to agents of the general Government inquiring into the cause of disease: gross misstatements as to its expenditures were announced in Congress; and, that body, repenting the good it had done, or forgetful of the past and unmindful of the future, crippled both the resources and the jurisdiction of the Board. Finally, when $100,000 was placed in the President's hands to use against epidemic disease, he made the Marine Hospital Service his agent, and the National Board found constructive insult added to the injury that, as a scientific body, it had already received. It would be strange if a new organization, with such delicate functions, should not have committed some errors; but it is safe to say that a small non-political council that contained such men as Cabell, of the University of Virginia, Bowditch, of Massachusetts, and Bemiss, of Louisiana, could not go far astray in either aim or method. A preliminary report on the yellow fever in Texas, by the Surpervising Surgeon-General of the Marine Hospital Service, shows that a *cordon sanitaire*, extending for several hundred miles, was the particular and effective means employed to defend the uninfected regions."

DISINFECTION.

The fifth report of the Commissioners of Prisons of England for the year 1881-82 contains in the appendix an interesting report by a committee, on the best mode of cleansing and disinfecting the private clothing of prisoners, from which we make the following extracts:

"After giving the subject the very serious consideration it deserves, we have arrived at the conclusion that the most effectual disinfectant is heat; in fact, it is the only one with which we have experimented that has not failed in one or the other of the points above mentioned.

"1st. We would suggest that each prison should be furnished with a hot air chamber, of a size proportioned to the prison.

"We think in very large prisons it might be desirable to have one for the females as well as the males.

"That this room should be fitted with racks divided into compartments.

"That each prisoner's clothes [boots excepted] should be placed very loosely in one of these compartments.

"That the heat should then be raised to 245° Fahr., and kept at that temperature for two hours.

"The boots, which will not stand this temperature without damage, we recommend should be exposed to the outer air for forty-eight hours before being finally placed with the other articles of clothing in the private clothing store room.

"Hard felt hats are also likely to suffer from being subjected to such a heat, but we do not think that they should be exempted from the process."

We have to go away from home to learn all about New York, and the farther we go the more we learn. The Atlanta, Georgia, *Times* says "that Broadway is paved with Belgian pavement, and, when well laid, it is said that it will last a century without repairs." There's the rub. That is what every advocate of every pavement says, but the trouble is, that they are never "well laid" when the time comes that their defects appear. The Broadway pavement, however, was a good pavement when laid, and until the subterranean experimenters got hold of it. But it is not the "Belgian" pavement. That name is used to designate the pavements made of blocks of trap rock which are square on top and laid on sand foundation. The Broadway pavement is of granite, in blocks longer and narrower than "Belgian" blocks, and it is, or was, laid on a concrete foundation. How much concrete there is now in the lower part of Broadway where the various private companies have been tearing up the steeet, no one can tell. The numerous excavations have broken the bond of the concrete, and also of the pavement, and the roadway of this, the most heavily travelled street in America, is execrable. And it is likely to continue so until we get a Board of Aldermen that will abstain from giving unlimited privileges to their friends to override the officers who are supposed to control the streets.

Under date of November 6, 1882, Dr. Hamilton, Supervising Surveyor-General of the Marine Hospital Service, makes a report to the Secretary of the Treasury upon the yellow fever epidemic on the Rio Grande.

From this it appears that the total number of cases at Brownsville and Point Isabel, from August 1 to November 4, was 2,030, with 117 deaths, which is certainly an extraordinarily low mortality, so low in fact that one can hardly help suspecting that many of the so-called cases were not really yellow fever.

The measures relied on by the Treasury Department to prevent the spread of disease, were first, the establishment of a *cordon sanitaire* to restrict travel to and from the infected district; second, the maintenance of a hospital for the sick; and third, disinfection.

The cordon was established by guards for a distance of one hundred and sixty miles. The period of detention of persons from the infected district was ten days, and baggage presumed to be infected was not allowed to cross at all. The total expense to September 30 amounted to $26,856.23.

THE EDISON SYSTEM OF WIRING BUILDINGS FOR THE INCANDESCENT ELECTRIC LIGHT.

No. II.

(Continued from Page 28.)

One form of cut-out used in ordinary buildings was not mentioned in the proper place. It is that used on main horizontal lines where branches are taken off to fixtures. Generally branch lines are connected with the mains by winding the smaller wire tightly around the larger (after both have been scraped clean) and soldering them together, but this cut-out provides for connections by binding screws.

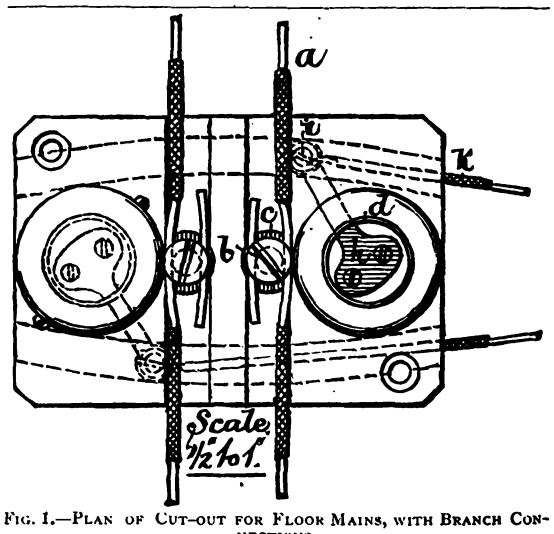

FIG. 1.—PLAN OF CUT-OUT FOR FLOOR MAINS, WITH BRANCH CONNECTIONS.

Figure 1 shows a plan of it and Figure 2 a section and elevation. The main wire *a* is bound by the screw *b* to a plate *c* which connects with the corrugated copper band *d*, lining the socket of the wooden plug *e*, around which is another band having corresponding screw threads fitting into the other, serving both to transmit the current and to hold the plug in place. To the copper band surrounding the plug is soldered the lead

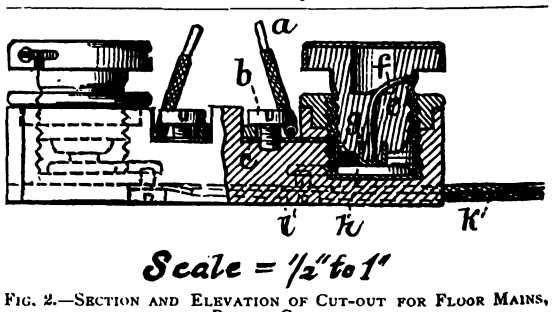

FIG. 2.—SECTION AND ELEVATION OF CUT-OUT FOR FLOOR MAINS, WITH BRANCH CONNECTIONS.

wire *f*, forming the "safety-catch," passing down through the plug and soldered to a copper cup *g*, which (when the plug is screwed down) is pressed against the brass plate *h*, to an arm of which is bound the branch wire *k* by the screw *i*. The return wire is connected in the same way though a duplicate cut-out.

From the preceding general description of the methods employed in buildings of ordinary size, we now pass to the consideration of the system as applied to a very large building. We have chosen for this purpose the Mills' Building, where provision has been made for a greater number of electric lights (over 5,000) than in any other building in this city and probably greater than any other in the world. A brief notice of the

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work, stating the amount of wire, etc., used, was given at the end of an article in THE SANITARY ENGINEER of August 10, 1882 (Vol. VI., page 203), on the plumbing of the building.

The Mills' Building is located on Broad street, at the corner of Exchange Place, which location is just outside the first district of the Edison Company, and in the second which includes the whole of the city south of Wall and Rector streets. As the plant of this district is not yet established, the actual lighting of the building is a thing of the future. The wiring was done while the building was in process of construction, which ended a few months ago. Though intended to be lighted from the central station like any other building in the district, it is possible that an isolated plant may be established for this alone, as has been done for several much smaller buildings in the city.

To show the method of distribution, a plan of one of the most "heavily" lighted floors (the eighth), is shown on page 53. This does not include the Wall street wing. The

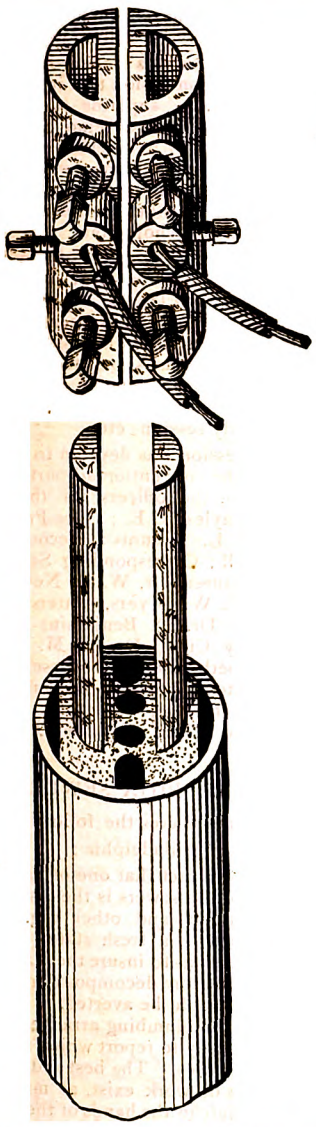

FIG. 3.—COUPLING BY WHICH BRANCHES ARE TAKEN FROM THE VERTICAL MAINS.

central space marked "court" is open only above the first story, being roofed over at the second floor. The main entrance is through this covered court.

The main building (that part shown on the plan, being the whole except the Wall street wing), is divided into four sections by the court and the two halls at right angles to Broad street. The four sections are lighted separately from four vertical mains, one near the corner of each section. These vertical mains instead of being wires as in smaller buildings, are electric tubes like those used in the street. They are placed in hollow-brick flues and extend from the cellar to the eighth floor, decreasing in size as branches are taken off at each floor. The way in which the branches are connected to the main vertical tubes is shown in Figure 3, which also shows the appearance of the copper conductors projecting from the end of the wrought iron tube, and the millboard washers or diaphragms. Over each of these connecting couplings a tin water-shed is soldered around the pipe, to keep from the conductors any moisture coming down on the pipe.

Each of the four sections is subdivided on each floor into divisions embracing generally one suite of office-rooms with the fixtures in the hall alongside these rooms. On the floor shown in the plan, most of the suites consist of a large room containing a chandelier and from two to seven side lights, and two smaller rooms containing from two to four side lights. As many wires are taken from each vertical main at every floor as there are divisions in its section. Provision is made for cutting out the whole section by a cut-out placed in a pocket under the floor close to each vertical main (which will be found marked on the large plan near the front or bottom). A plan of this cut-out is shown in Figure 4. The wire *a* passing under the front of the block, comes up through a hole and is bent forward and fastened down by a binding screw to

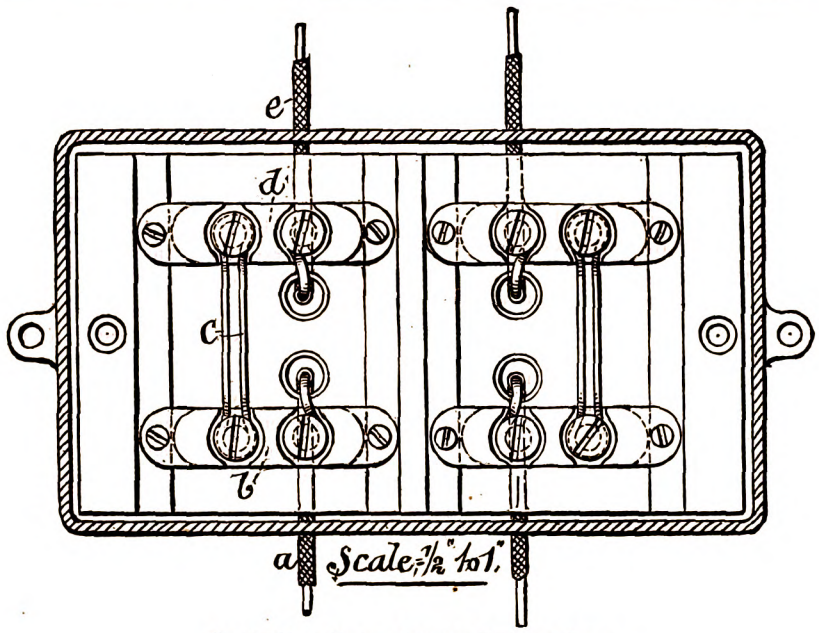

FIG. 4.—MAIN CUT-OUT CLOSE TO VERTICAL TUBES.

the brass plate *b*, from which to the corresponding plate *d* on the other side the current passes through the lead wires or link *c*, thence out through *e*. Both poles are thus "cut" on the same block, as shown. Each line has also a "division cut-out" for every division, of a form similar to the "wall cut-out" shown in the first part of the article. These are also in pockets in the floor, a little removed from the main line in most cases (as shown in the plan), to bring the pockets in the corner of the room where they would be more accessible on account of carpets, etc. Each fixture is provided with a single pole "wall cut-out" as in ordinary work. The sizes of the fusible lead wires constituting the "safety-catches" in the cut-outs are so adjusted that no more lights will be put out when a catch fuses than is necessary; for instance, if the obstruction is between a wall cut-out and a division cut-out, the latter would burn out (before the main section cut-out) and only that division be cut off.

The horizontal lines are carried under the floor in wooden boxing except under tile floors, as the halls, where either electric tubing is used or lead pipe. The latter is used under the floor of the court in the basement, each wire being heavily taped (outside the regular insulation), and put in a separate pipe, which is also taped on the outside and buried in the cement. Zinc tubes are used for connection with the side fixtures.

The Wall street wing makes a fifth section, which is supplied from a fifth vertical main in a similar manner.

DRAINAGE AND VENTILATION OF HOUSES.

The following is an abstract of a paper read by Mr. Rogers Field, Nov. 17, before the Society of Medical Officers of Health, London:

Three sanitary principles govern house drainage. These are:

First.—All refuse matter must be completely and rapidly removed from the house.

Second.—There must never be any passage of air from the drains or waste pipes into the house.

Third.—There must be no connection between the drains and the domestic water supply.

These, although so simple, are very frequently neglected. The first goes absolutely to the root of sanitation, for were it strictly complied with there would be no leaky drains, no polluted sub-soil and no production of foul gases in the drains from decomposing organic matter. There cannot be a greater mistake than to assume, as is commonly done in investigating drainage, that if water runs away with freedom this is all that is required. Numerous cases are on record where the sewage from houses has apparently run away freely for years, but where the greater portion of it has really been leaking out of the drains into the ground under or close to the house.

In illustration of this point the author quoted two cases in his own practice, one in which the connection with the sewer was actually found to be blocked with shavings which had been left in when the house was built three years before; the other that of a school in which the drainage from the lavatories had leaked through disused drains under the floor of a large portion of the building, and although there was a mass of filth in some places seven feet deep, no leakage had been suspected.

If the drains are exposed and found clean and jointed with cement, this is not sufficient; the tops of the joints may be good and the bottoms bad. The only safe method is to actually test the drains by plugging them at the lower end and filling them with water; very few house drains indeed stand this test.

Even if the drains are outside the house, it is a mistake to assume that it is unimportant whether they are sound or not. Not only may sewage leak out of faulty joints and percolate under the house, but foul air may be drawn into the house.

It is important to realize how small an amount of deposit will create mischief by decomposing and generating foul gases; a mere irregularity of the joints, even when the drain has a good fall, is sufficient to cause this. There is no better test of the condition of the drains than the amount of smell emitted from a ventilating opening, for if drains be properly laid and in thorough working order practically no smell should exist.

The householder should guard against trusting too much to those parts of the drainage of a house which are visible, as an index of the condition of other and important parts which are concealed. An instance was mentioned of a house, the drainage of which had been recently reconstructed, and where all the sanitary arrangements

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appeared at first sight to be perfect, but where a subsequent examination of the drains which were under the house showed that the joints were in many places defective and at one point the pipes were not jointed at all, but a space left large enough to put a hand in. Old drains which had no outlet connected were found beneath the passages and rooms; the housemaid nearly died of typhoid fever, and beneath the room she occupied was found an old drain with a large amount of foul deposit.

In another house a lady and her cook were attacked with erysipelas and blood-poisoning shortly after occupying it. Various alterations were made in the drainage, in the absence of the family, but, on their return, the lady was again attacked with erysipelas, and shortly after other members of the household. Again alterations were made and again the lady and the housemaid were attacked. An examination of the house showed that an old stoneware drain in the scullery, into which the sink formerly discharged, had not been removed, and though stopped with cement was imperfectly closed, allowing the air of the drain to enter the house.

The curious and unexpected paths drain air may sometimes take were discussed by Mr. Field. It had been known to pass along bell wire tubes, the proximity of the bell pull to the fireplace giving an increased opportunity for air to be drawn by the suction of the fire from a distance to this part of a room. Channels for gas pipes and for hot water pipes also not uncommonly give facility for the admission of foul air. A remarkable case was given, where the occupants of a particular bed in a school were constantly the subjects of slight attacks of pneumonia with tendency to typhoid. In this case the foul air was conducted from a lavatory, where there was defective drainage, up a staircase, and impinging on the ceiling of the dormitory was reflected on to the bed where the sickness occurred. The cause of the Duchess of Connaught's recent illness was found in defective drainage. Numerous experiments on the means by which the foul air entered the Duchess' bedroom showed that it was only when occupying certain positions in the room, that she would be exposed to the influence of the foul air, while in bed she would escape. As a matter of fact in twenty four hours after sitting on a sofa in one of these exposed positions, symptoms fully developed themselves.

In conclusion, the necessity of thorough separation between the domestic water supply and the drains was insisted upon.

A CONTAMINATED WELL.

The Concord, N. H., *Daily Monitor* recently contained an article on the pollution of the water of a well in the State House Yard, to which a case of typhoid fever had been attributed. The water of the well had been analyzed by Dr. I. A. Watson, and found to be dangerously contaminated with organic matters. It was, however, bright and cold, and had a good deal of popularity on that account. The case seemed sufficiently interesting to obtain a fuller statement from Dr. Watson, who is Secretary of the New Hampshire State Board of Health, and in response to a request from us we have received the following letter and illustration:

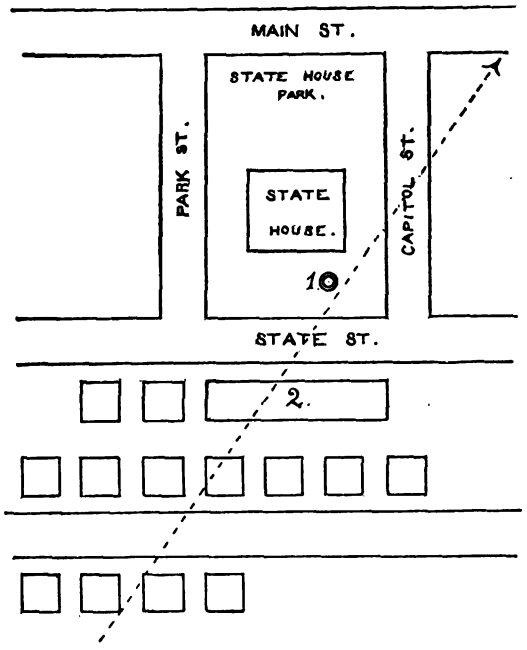
STATE OF NEW HAMPSHIRE.
OFFICE OF STATE BOARD OF HEALTH,
STATE HOUSE, CONCORD, *Dec.* 12, 1882.

To the Editor of THE SANITARY ENGINEER:

Your favor asking for further particulars regarding our State House, in addition to the item which you clip from the Concord *Daily Monitor*, is at hand.

The item is correct in every particular. The dangerous character of the well was exhibited by the very large amount of chlorides and nitrates that were developed by chemical reaction. In the waters of this locality no chlorine is to be found, except from contamination, and the very abundant amount that the water of this well contained left no doubt that sewerage pollution was its source.

The sketch indicates the relative position of the well to suspected sources of contamination, 1 being the State House well, and 2 a large tenement block; [] [] are residences. The dotted line with arrow head indicates the general direction of soil drainage in the immediate locality. The distance from the well (No. 1), to the nearest building (No. 2) is about 125 feet. This particular block has a population from 50 to 80 persons, and the sanitary conditions are such as to indicate that the well might readily be contaminated from it. How long this condition of the well may have existed is uncertain, as no analysis has before been made, that I am aware of. The case of typhoid mentioned in the article quoted terminated fatally, and I am informed that the deceased used only water from this well for drinking purposes. Subsequently, I have examined a sample of water from two wells in other and different localities in this city, and found them dangerously polluted. How any other result could be expected in a city as old as this, having had a system of sewers only a very few years, is beyond my



comprehension; yet there are those who would drink out of the pool of Siloam, rather than draw their pocket books for even a very inconsiderate amount.

Yours, etc., IRVING A. WATSON.

THE SANITARY ASSOCIATION OF NEW JERSEY.

The Sanitary Association of New Jersey held its eighth annual meeting at Trenton, the 14th and 15th of December. Among the gentlemen present, who are well known for their interest in various directions of sanitary work in New Jersey, were Dr. E. M. Hunt, President of the National Board of Health; Prof. A. R. Leeds, of the Stevens Institute of Technology; Profs. MacMillan and Libbey of Princeton; Mr. J. A. Adams, C. E., of Brooklyn; Mr. J. C. Bayles, editor of the *Iron Age;* Dr. Henry Mitchell, of Asbury Park; Mr. E. C. Dunn, of Newark, and others. Prof. J. Madison Watson, President of the Association, presided.

The first paper was by Prof. MacMillan on the "Disposal of Sewage in Inland Towns and Places."

The water carriage system on a large scale and under proper conditions is undoubtedly the least expensive. Easy access to a large body of water which shall carry the sewage discharged out beyond the limits of the town is the essential condition for this system. When it exists the speaker was of the opinion that even small settlements would find it more satisfactory in every way than the expedients they usually adopt. He concluded that fresh water streams have the power of destroying organic impurities which are mixed with them, and it is not therefore necessarily unsafe to cast sewage into streams of potable water. The capacity of any particular stream to effect such destruction depends on the degree of dilution of the foul matters; on the original purity of the stream and the degree of disturbance of its current, as bearing on its oxidizing powers; on the climate, the character of the soil on the bed of the stream, and on the presence of aquatic plants; and, finally, on the time of exposure of the putrescible matters to their reducing agencies.

Mr. Bayles followed with a paper on "The Problem of Drainage of Inland Towns." In illustration of what he considered the best system he described that of Birmingham and the Saltley Sewage Farm, with which our readers are already familiar. The evening session was devoted to the annual address by Prof. Watson, and to the reading of a paper on "The Disposal of Sewage in Cities" by Mr. J. A. Adams, C. E., with a discussion.

At the second day's session, after the reading of the annual report by the Corresponding Secretary, Dr. E. M. Hunt, the subject of "Adulteration of Foods, Drinks and Illuminating Oils" was brought forward. Prof. Cornwall, who was to have treated the subject, was absent, and it was discussed by Prof. Leeds. Power was required to punish persons guilty of adulteration, and unless that power were given, he feared the trouble incurred in detecting impurities would not be repaid. In the samples of mustard that he had examined, the purest kind contained 81 per cent. of mustard, and the poorest only 9 per cent., and 91 per cent. of something else. His report had been that the purest mustard was not absolutely pure. Naturally the manufacturer was aggrieved at this state of things. Upon making an examination of the works where that brand was made he found that a certain amount of the oil was extracted, which accounted for the deficiency. The extraction of the oil was made to prevent the mustard becoming rancid.

Prof. Leeds had prepared a table showing the nutritious properties of some of the many preparations sold for the use of children as food for infants. His conclusion was that the nearer the preparations conformed to nature's pattern the better.

Following Prof. Leeds' paper, the convention entered into a discussion of Prof. McMillan's paper of the previous day, after which Dr. E. L. B. Godfrey, of Camden, read a paper on the sources of humanized and bovine virus. He concluded that lymph should be propagated from animals of acknowledged health and quality, and State Legislatures should encourage the propagation of bovine virus for gratuitous distribution.

Dr. David Warman read a paper on revaccination, in which he reached the conclusion that in point of protective power bovine lymph is superior to humanized virus. Humanized virus, but a few removes from its bovine origin, is little inferior to it in efficiency, but continually transmitting it through the human system is a cause of gradual and certain deterioration. He recommended that the State of New Jersey should maintain a vaccine farm for the protection of the whole State.

A discussion on the adulteration of food followed, and then a paper was read by Rev. F. R. Brace on "What is feasible as to method and law for the protection of schools from uncleanliness and contagious diseases?" Prof H. B. Peirce, of New Brunswick, discussing the question of health in the public schools, submitted a number of resolutions concerning the management of schools in cases of contagious diseases appearing in them; the length of the school year, the daily session, etc.

The rest of the session was devoted to discussions of reports, after which the convention adjourned.

The following are the officers for the ensuing year: President, J. C. Bayles, C E.; Vice-Presidents, Dr. F. Gaunt, and Dr. L. Dennis; Recording Secretary, Dr. Henry Mitchell; Corresponding Secretary, J. Madison Watson; Treasurer, Dr. W. K. Newton; Executive Council, Dr. C. F. W. Myers, Paterson; Prof. A. R. Leeds, Hoboken; Dr. D. Benjamin, Camden; L. B. Ward, C.E., Jersey City; Dr. E. M. Hunt, Trenton; R. Wescott, Elizabeth; Louis Derousse, Camden; Rev. W. Harris, Princeton; Prof. H. B. Peirce, New Brunswick; Dr. J. L. Bodine, Trenton; Martin Coryell, Lambertville; S. W. Elder, Hoboken.

PHILADELPHIA SEWERAGE

The *Medical News* makes the following sensible comments on the needs of Philadelphia:

"It is a well known fact that one of the chief causes of the foul condition of the sewers is the discharge into them of decomposing excreta and other organic matter. If house-sewage escaped in a fresh state, and sewers were properly constructed so as to insure the ready and quick removal of this matter before decomposition sets in, the evils most complained of would be averted.

"With regard to the plumbing arrangements of houses, there is nothing specially to report which is not common to almost all American cities. The best and the worst and all intermediate grades of work exist, as might be expected when the matter is left in the hands of the owners of property and mechanics. Owners, as a rule, have not the special sanitary knowledge required in designing and supervising the work; the mechanics can hardly be expected to execute the most skillful labor when their financial success depends so largely on the greatest economy in construction. Their lack of knowledge of the correct sanitary principles of house drainage, is also a very frequent cause of defective work. The remedy is found in the public regulation and supervision of house drainage. This plan has been applied with great benefit in Providence, R. I., and has also recently been inaugurated in New York city. The regulations adopted by New York Board of Health may be found in full in our issue of November, 1881.

"The evils which result from defects in plan and execution of house drainage, as exemplified by the methods pursued in Philadelphia, are to be remedied: *First.* By prohibitory laws with regard to cesspools and pits of every description. *Second.* By compulsory laws on the subject of sewer-construction where sewers exist; and in their absence, by the enforced adoption of the 'dry-removal' system. *Third.* By the systematic regulation and supervision by the civil authorities of the details of private drainage arrangements, and by periodical inspection by properly qualified public officers."

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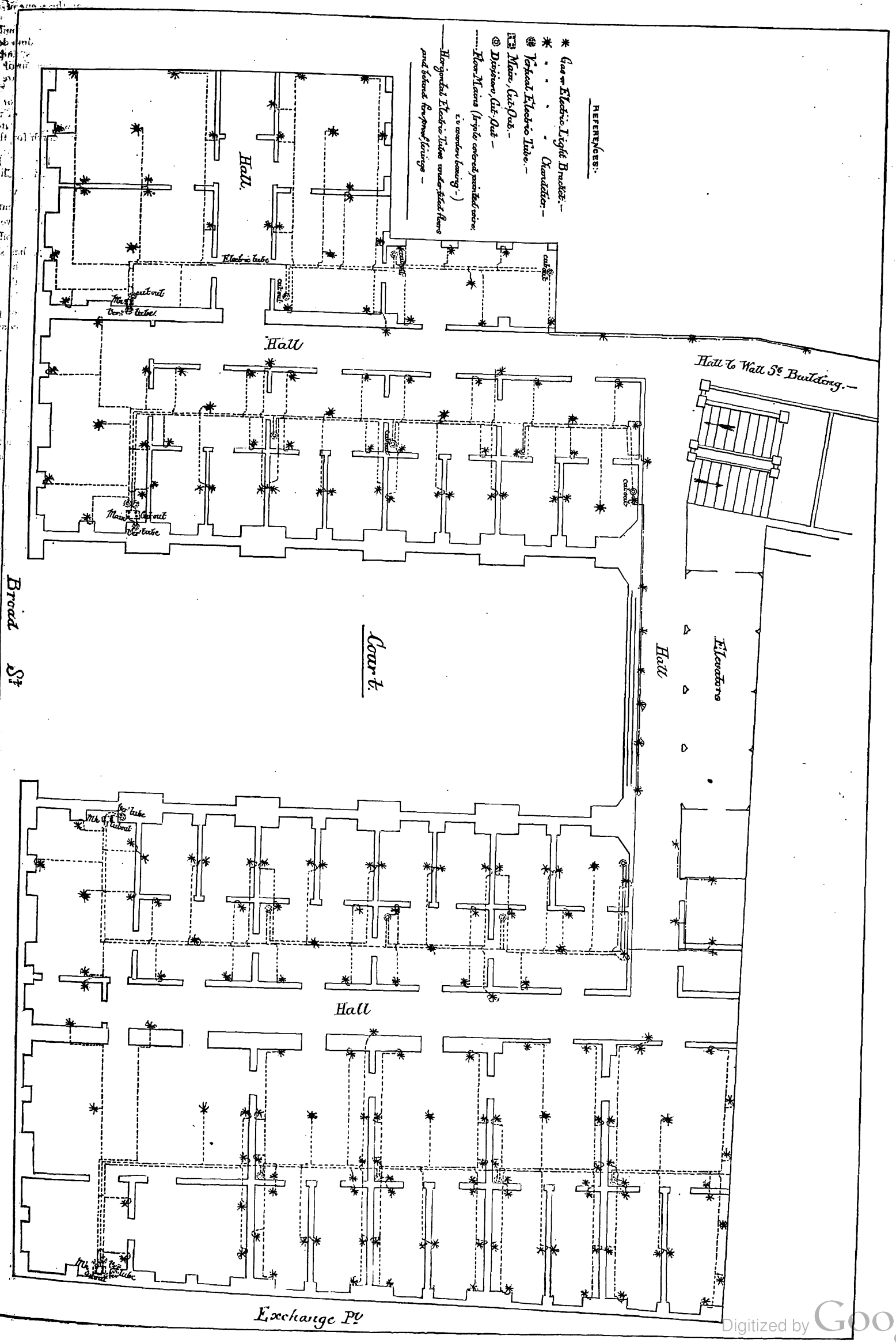

PLAN OF THE EIGHTH FLOOR OF THE MILLS BUILDING, SHOWING LOCATION OF ELECTRIC LIGHT FIXTURES, VERTICAL MAINS AND CUT-OUTS AND COURSE OF THE WIRES.—(See Page 51.)

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THE PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The grocers against whom the State Board of Health has commenced prosecution for selling adulterated cream of tartar, appeared at the Court of Special Sessions on Friday last, and asked for an adjournment. It was claimed by counsel for one of the defendents that the Penal Code repealed the law under which the cases were brought, but this was denied by the court.

It appears probable that the Grocers' Association, of which some of the defendants are members, will take some action in the matter. We also understand that the parties of whom the grocers purchased the adulterated goods will be called upon to defend their action.

John Bade, of 124 Canal street; Ernest Spanhoff, 19 Bayard street; and J. H. W. Doscher, 324 Broome street, have been held in $300 bail each to answer for selling adulterated cream of tartar.

OIL OF PENNYROYAL.

The Pharmacopœia states that this oil has a specific gravity "about 0.940." Ten samples recently examined had the following properties:

No.	*Color.*	*Specific Gravity.*	*Temp.*
1.	Light yellowish	0.93203	17 deg. C.
2.	" "	.92973	17 "
3.	" "	.92605	16 "
4.	" "	.92691	16 "
5.	Dark "	.91323	16 "
6.	Light "	.92193	17 "
7.	" "	.93619	16 "
8.	Nearly colorless	.93114	16 "
9.	Light yellowish	.94011	16 "
10.	" "	.93725	16 "

All dissolved clear in one-half volume of 91 per-cent. alcohol. Number eight was the finest specimen; number six contained a small amount of alcohol; four and five had an odor of turpentine, but whether this was due to intentional sophistication, or to decomposition of the oil is hard to tell.

The samples differed considerably in odor, several reminding one strongly of peppermint. The only one really free from any foreign odor was number eight.

MEDICATED SOAPS.—The *Seifenfabrikant* gives the following recipes for the manufacture of the above:

Tannin Soap.—Nine kilos. of coccanut oil are saponified with four and one-half kilos. of soda lye, then 250 grammes of tannin, which has been previously dissolved in spirits, are put in and mixed. The soap is perfumed with 30 grammes Peru balsam; 10 grammes cassia oil; 10 grammes oil of cloves.

Iodine Soap.—Ten kilos. cocoanut oil, five kilos. lye at 38° B., one and one-half kilos. of iodide of potassium, dissolved in one-half kilo. of water.

Gall Soap.—One and one-half kilos. of galls are stirred in 25 kilos. of melted cocoanut oil, and the latter then saponified cold with 22½ kilos. of soda lye at 38° B. The soap is colored with 350 grammes of ultramarine green, and perfumed with 75 grammes lavender oil, 75 grammes cummin oil.

Camphorated Sulphur Soap.—Twelve kilos. of cocoanut oil. six kilos. of soda lye of 38° B.; one kilo. of sulphate of potassium, dissolved in one-half kilo. of water; 160 grammes of camphor, which is to be dissolved in the melted cocoanut oil.—*Chem. and Drug. Oct.* 14, 1882.

Considerable cod liver oil of good quality is now produced at Swampscott, near Lynn, Massachusetts. This oil is used at the Massachusetts General Hospital, and is reputed to be equal to the best Norwegian.

In some experiments as to the conditions conducive to the action of pepsine, made by Herr A. Mayer (*Zeits. f. Biol.*, xvi., 351; *Mon. Scient.*, [3] xii., 842) it was found that the action was favored by elevation of temperature; the limit is, however, reached at 55° C., for between 55° and 60° the ferment is killed. Hydrochloric acid of a strength corresponding to two parts of acid in 1,000 was found best to promote the action. Other acids were tried and gave results corresponding with the following order:—nitric, oxalic, sulphuric, lactic, tartaric, formic, succinic, acetic, butyric, salicylic. The last two had no action. Coagulated albumen was the substance operated upon and the pepsine used was prepared by macerating the mucus from a pig's stomach with glycerine and precipitating with alcohol. The presence of bacteria did not in any way retard the action of the pepsine.—*Phar. Journal and Trans., Sept.* 30, 1882.

The *Medical News*, of Philadelphia, some time since, appointed a commission to examine and report on the composition of pharmaceutical preparations. In the issue of December 16 a report is published on two-grain quinine pills of seven different makers. The methods of assay is given together with the results obtained, which vary from 1.61 to 2.10 grains per pill. The general results of this investigation are stated to be:

"*First.* That the quinine pills of five out of seven of our leading manufacturers have not in them the amount of sulphate of quinine which they are represented to contain.

"*Second.* That there is a great variation in the price at which the pills can be purchased.

"*Third.* That the price bears no relation to the amount of quinine really contained in the pills."

In a future issue we shall print a communication on the methods of assay of quinine pills.

The New England Milk Producers' Association, at their meeting in Boston the 12th inst., decided to present a bill to the State Legislature this winter, regarding the adulteration of milk and its inspection, under the State's authority.

"Good morning, Mrs. Simpkins. I see that you haven't any milkman now." "No; Mr. Simpkins has made an arrangement with the water company, and we've got a hydrant in the house."—*Louisville Courier Journal.—Herald, Syracuse.*

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Dec. 16.....	24.06	19.57	20.17	25.05	29.70	19.55

E. G. LOVE, Ph.D., *Gas Examiner.*

GAS PIPES IN THE STREETS.

We have already called attention to the ordinance passed by the Board of Aldermen in 1876, granting permission to any gas company to lay pipes in the streets of this city, subject, however, to conditions to be named by the gas commission. Under this ordinance a new company recently asked the commissioner to state the conditions under which it could lay pipes in the streets. Up to the present time no action has been taken in the matter. It appears that at the meeting of the aldermen on the 12th inst., the ordinance in question was rescinded, and if this action is approved by the Mayor it will make it impossible for any new gas company to use the streets of the city without special permission from the Board of Aldermen. At the same time it takes away the power of the gas commission to dictate the conditions under which the streets may be used.

It would probably be a matter of no great difficulty for a gas company to get permission from the Aldermen to tear up the streets for the purpose of laying gas mains, whether these mains were needed or not. It therefore seems to be a question of choosing the lesser of two evils: either rescind the ordinance and trust to the uncertain action of a Board of Aldermen to give unlimited power, or let the ordinance stand and depend upon the gas commission to name such conditions as shall make the work of a new company a benefit and not an evil to the public.

SHUTTING OFF GAS FROM BURNING BUILDINGS.

NEW YORK *Dec.* 11, 1882.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR:—I have always noticed that at large fires the subsiding of the flames and the cooling of ruins are greatly retarded by great sheets of flames, issuing from the broken service pipes, which lead from the gas main in the street to the interior of the buildings.

In many cases, it is impossible to stop this flow of gas for several days after the fire, as it is necessary to dig down to the pipe, outside of the burned building, which is not readily done in winter, or when the streets are obstructed.

I would, therefore, make the following suggestion, which I think could be carried out. A stop cock should be put in every service pipe outside all buildings, to which access could be had by firemen, policemen or other proper persons, by means of locked plates in the sidewalks, and a rod protected by a pipe reaching to the stop cock. This would enable proper persons at the scene of a fire to cut off the gas whenever it seemed necessary.

The only way to cut off the gas from a building now, is to shut it off at the meter. This is seldom done, because meters are put in out of the way places, and even if it is done, the flow of gas is only stopped until the building burns down, and the meter pipes, which are of lead, are melted off the service pipes.

If gas companies would adopt this plan, or something to that effect, much labor would be saved. It would enable the firemen to cool the ruins with less water, and when bodies are buried in the debris, search for them could be made sooner than at present.

Respectfully yours, EMIL H. KOSMAK,
13 and 15 Chatham street.

[The suggestion of our correspondent, who is a member of the Fire Department of this city, is entitled to consideration. There are a few cities which yet rely on stop cocks below the sidewalk to shut the gas off from a burning building. Experience, however, has shown that in most cases after a fire has broken out, the stop cock cannot be easily got at, because the box is filled with dirt and rubbish, and in spite of its existence, the street must be dug up in order to cut off the supply of gas. This experience, we believe, has induced many companies to rely on digging up the streets when they wish to cut off the gas from a burning building.]

THE EARLY USE OF COAL IN ENGLAND.

About the beginning of the thirteenth century, much objection was raised against the introduction of coal into London on the plea that its smoke was an intolerable nuisance. This opposition was continued for nearly two hundred years in some quarters, but was at last obliged to give way before the growing necessity of timber. Toward the beginning of the fourteenth century, many shallow collieries were opened out in the neighborhood of Newcastle-on-Tyne, but little is known about the progress of the use of coal during the course of the fifteenth century. There is enough to show, however, that the demand for coal went on increasing. In a petition presented to the council by the Company of Brewers in 1578, we find that corporation offering to use wood only in the neighborhood of Westminster Palace, as they understand that the queen findeth "hersealfe greatley greved and anoyed with the taste and smell of the sea cooles." Another author, writing in 1631, says that "within thirty years last the nice dames of London would not come into any house or room when sea coals were burned, nor willingly eat of the meat that was either sod or roasted with sea-coal fire." Soon after the commencement of the seventeenth century, the use of coal for domestic purposes, as well as for washing, brewing, dyeing, etc., was general and complete. The mines were still shallow, and they were drained by means of horizontal tunnels called adits, water-gates, etc. Already attempts had been made to sink some of them under the water level and to raise the water by machinery. In the year 1486–87, the monks of Finchdale Priory expended a sum of money at one of their collieries on the Wear "on the new ordinance of the pump," and on the purchase of horses to work it. Underground fires and noxious gases began also to appear about this time. The miners' tools consisted of a pick, a hammer, a wedge, and a wooden shovel. The coal was raised to the surface in some cases by means of a windlass; in others, as in the mines of east Scotland, it was carried up stairs on the backs of women called coal-bearers. In the year 1615, the fleet of vessels called the coal fleet, which carried the produce of the northern collieries—one-half to London, the remainder to other destinations—numbered 400 sail. Many foreign vessels also, especially French, carried away cargoes of coal to their respective countries. Twenty years later, the coal fleet had increased to 600 or 700 sail, and was already regarded as "a great nursery of seamen."—*Engineering and Mining Journal.*

ELECTRIC LIGHT NOTES.

The electric light has excited the alarm of the chief local magistrate of Shanghai, who declares that its introduction into the foreign quarter of the city will be followed by total destruction.

The need of electric lamps along the water front of Philadelphia to enable the unloading of vessels to be performed with more facility, and to afford protection against thieves, has induced the Philadelphia Councils Committee to confer with the Brush Company about the cost of supplying lamps. Some members of the committee prefer to open the supplying of the lamps to general competition, rather than to awarding the contract immediately to the Brush Company.

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Meter-ites.

By a vote of eight to two, the Jersey city Aldermen have decided to grant a charter to a new gas company, which is expected to furnish gas for $1.50 per 1,000 cubic feet.

Waterbury, Ct., has come to the conclusion that it had better make a contract with one of the gas companies. No electric light company has yet been formed there.

The Boston Gas Light Company propose to reduce the price of gas to $1.80 per thousand feet from and after January 1. This is a sensible move, and if the New York companies are wise they will do the same thing.

The town of New Lots has made a ten year contract with the Empire Gas Company of Brooklyn to furnish gas to the town and to private consumers at $25 per lamp to the city, and $2.50 per 1,000 cubic feet to private consumers. When private consumption reaches 30,000 cubic feet per day the price will be lowered to $20 per lamp and $2.25 per 1,000 cubic feet.

The City Engineer of Hamilton, Ontario, Mr. William Haskins, has recommended to the City Council that arrangements be made for ventilating the sewers by manholes with grated covers. The *Evening Times* of that city thereupon devotes a column to a dissertation on ventilation of sewers, and suggests a plan which it considers "theoretically nearly perfect," but admits that it has never seen it in use. It consists in attaching to the furnace or stove which heats a house, a tight iron chamber of about a cubic foot capacity, and leading a 2-inch iron pipe from the house drain to this chamber, and another from the chamber to the chimney flues. The working of this arrangement is supposed to be as follows:

"When the fire is lighted, the air in the cubical chamber becomes heated and passes off to the flue, leaving a vacuum, to which the foul air is drawn from the sewer pipe. The heat kills all disease germs, and the foul air, greatly rarefied, passes off through the flue. The draught is downward from the sinks, closets, roof ventilator, etc., instead of upward, and no sewer gas can go into the rooms."

Here is the old idea again, that the movement of air in a long system of pipes can be controlled by heating a little piece of the pipe. It does not work satisfactory, and it cannot be made to. Then the introduction of all the extra joints and fittings into a house, which such an arrangement would require, and compelling all the foul air from the drains to enter and pass through the house in going from the drain to the chimney, would add to the chances of pollution of the air of the house from leaky joints, especially as the pipes would be subject to great change of temperature. To be sure, the *Times* thinks it has provided for all contingencies by suggesting that "when the fire goes out, the ordinary arrangement of traps and ventilators come into play, and in summer the connection of the iron chamber with the sewer could be cut off by a stop-cock," but then who is to be detailed to man the stop-cock?

The writer seems to have more regard for the business interest of the foundries, which he says are plentiful in Hamilton, than for the sanitary condition of the citizens.

He concludes by saying: "We commend this idea to stove and furnace manufacturers, who might make a profitable business out of it, now that so large a proportion of the houses in the city are connected with sewers."

Our advice both to manufacturers and consumers of stoves would be, to let such jimcracks alone, and provide no more inlets for bad air into their rooms than can possibly be avoided, and to furnish the sewers and drains with as many outlets to the external air as can be afforded.

Correspondence.

EXPANSION TANKS.

KANSAS CITY, MO., *Dec.* 6, 1882.

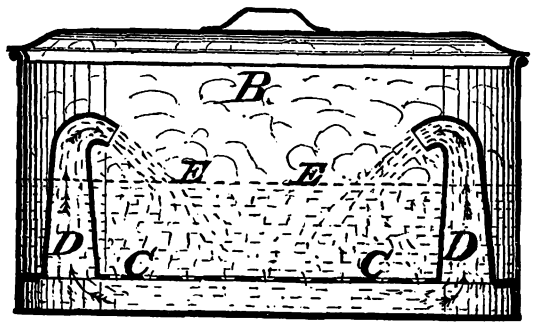
To the Editor of THE SANITARY ENGINEER:

I wish through your columns to make a few inquiries about hot water heaters, as to location of expansion tanks and hot water apparatus. I have had discussions on several occasions about their location. When I have my way on open jobs I place the tank at boiler and exhaust the air at ends, and I claim that when the job is running I get a more rapid circulation than if the tank is on end of job; that is, I get a direct return, while with tank at end it is lazy and hot water in tank evaporates, and the tank is always the hottest part of the job. Another advantage is that I can, with one tank, do what others require several for. One tank at boiler does the work of several at ends, either in closed or open jobs. I do not want it understood that I am asking for any instructions; all I wish to get is opinions as to efficiency. The idea is this, does a hot water apparatus circulate more rapidly when ends are closed than when they are open? I know about steam vapor, etc., at ends, and dispensing with those objections as I can do, I wish to get at facts regarding rapidity of circulation in either case. Hoping to hear from you in this matter, I am yours respectfully,

THOMAS H. WALKER.

[We can hardly make your statements of the case agree with each other. For instance, you say in speaking of the circulation "with tank at end it is lazy, and the hot water in the tank evaporates and *the tank is always the hottest part of the job.*" Now if the tank is the "hottest," the circulation between the tank and boiler must be rapid to make it so, and consequently is not lazy.

In reality, the location of the "tank" depends entirely on the arrangement of the work. If you rise from the boiler to the farther end of the circulation, the tank should be located at the farther end, for two reasons: you get a better circulation, and also relieve the circulation from air or vapor at the highest point, and it is this vapor and air which makes the circulation more rapid because it is lighter. This vapor, or air, or both, on account of being lighter than the water, naturally seeks the upper level, and in its efforts to reach it pushes or accelerates the speed of the water in its travel to reach the highest point. This principle is very finely illustrated in a patent clothes boiler which was very much in use in some parts of the country several years since, and was constructed as follows:



B is a common stove boiler; *C*, perforated false bottom resting on supports about two inches above the bottom of the boiler, and having two tapering tubes, *D*, *D*, bent at the top and opening underneath and fastened to the false bottom.

Now when this boiler is filled with clothes and water up to the water line *E*, the vapor generated below the false bottom carries the water above the water line through the tubes and forms a circulation, the water sinking back through the perforations to be again carried through the tubes. The more vapor generated, the more rapid the circulation.]

WHAT BURSTS THE PIPE?

NEWARK, N. J., *Dec.* 11, 1882.

To the Editor of THE SANITARY ENGINEER:

Will you be kind enough to inform me in the next edition of your esteemed paper what causes the bursting of lead pipe, the freezing, or the thawing? and oblige one of your subscribers. A. J. S.

[The bursting is caused by the freezing of the water, which, when formed into ice, is increased in bulk. The fact of the burst in the pipe is, however, only made manifest when the ice begins to melt.]

LEAD-LINED TANKS.

SING SING, N. Y., *Nov.* 30, 1882.

To the Editor of THE SANITARY ENGINEER:

Enclosed you will find a portion of a substance which formed in a sheet lead tank, lined by me about six weeks ago. This tank is fed by rain water taken from a shingle roof, and why oxidization to such an extent and in such a short time should take place is something unusual to me.

This substance has formed a coating, completely covering the sides and leaving a sediment on the bottom of the tank about half an inch deep.

I have had the tank cleaned out and painted with white lead paint. I was advised as to which would be the best, lead paint or shellac varnish, but I was afraid the latter would not stand the test of being exposed to water and air alternately.

By letting me know what this substance is, and why it should form in such a short time, you will greatly oblige.

Yours truly, R. L.

[The substance in question consists of carbonate of lead. Its amount is very excessive and shows that the water must have been heavily charged with carbonic acid or carbonates.]

SETTING HOPPERS.

NEW YORK, *Dec.* 5, 1882.

To the Editor of THE SANITARY ENGINEER:

In my judgment the best way to set a hopper on a marble floor is to countersink the marble, so that the lead flange will be flush with the floor. The lead surface should then be covered with white lead, and also the stem of the hopper that enters the opening. If there are screw-holes in the hopper flange, small brass bolts, of the same pattern as a basin clamp bolt, should be caulked into the marble with molten lead in such a way that the bolts will pass through the screw holes, and then the hopper to be fastened down with suitable nuts; but if there are no screw holes in the flange, then the bolts should be set outside the flange, but close up to it. In this case basin clamps would serve the purpose as well as anything I know of. The hopper may be set with common cement or plaster. Yours, J. M., JR.

THE VALUE OF EARTH CLOSET MANURE.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE,
HAMPTON, VA., *Dec.* 11, 1882.

To the Editor of THE SANITARY ENGINEER:

Will you kindly give me the opinion of the best authorities on the value of earth closet refuse for manurial purposes? We are taking a good deal of trouble to cart it off for our farm, and the wisdom of this is questioned.

Yours very truly, S. C. ARMSTRONG.

[You should apply to the editor of the *Country Gentleman* for this information. It would be interesting to have General Armstrong's opinion, based on his own experience, as to whether it is cheaper to buy manure or collect it in the way he is doing.]

TAKING RETURN BELOW BOILER.

The following letter from Mr. Tucker, of Boston, was received some months ago, and was at once referred to a gentleman who is an authority on questions connected with boilers. Owing to his numerous professional engagements, a reply was delayed, but we now publish it with a comment, as we think it will interest all our readers who regard the theory of boiler circulation as important. Some may wish to follow the correspondence from its beginning, and note the various opinions which practical men have expressed about the feasibility of securing circulation below the boiler or water-back. We would direct them to the following pages of the SANITARY ENGINEER, Vol. V., pp. 80, 121, 182, 326. Vol. VI., p. 85.

To the Editor of THE SANITARY ENGINEER:

In your 5th Vol., page 80, you published a cut at the request of Mr. W. W. Coleman. After reading your opinion thereon I made up my mind that you inadvertently omitted to inform Mr. C. that although the circulation would work well, he could not draw hot water at wash bowl, first story, and wrote you accordingly, which you were kind enough to publish in the same volume, page 182.

This letter was followed by a revised cut showing the proper way to supply the bowl through the added pipe *A*.

In your remarks following my letter, although a virtual admission was made that only a little hot water could be drawn at the bowl, and that from the bottom of the boiler, yet you say, Vol. VI., page 85, that B. made a fair point on T.

Now if THE SANITARY ENGINEER is willing to assert as correct the doctrine put forward by B., that an established circulation cannot be arrested by opening the tap at bowl, as shown in the first cut, and that hot water will run through it from top of boiler when the distance from this tap to boiler, by way of the return, is shorter than it would be from the top, I will have no more to say further than I am inclined to think you will not be sustained in your theory. Respectfully, J. T.

[The *point* on which Mr. Coleman asked information, Vol. V., page 80, was whether a circulating pipe below the level of the hot water boiler would or would not operate, Mr. Coleman contending that it would, while his plumber insisted that it would not.

We pronounced the plumber wrong. On page 182, Vol. V., you assume that we "inadvertently omitted to inform Mr. Coleman that *he will not be able*, with his system of circulation, *to draw hot water at wash bowl, first story*, since *water (cold) can only be had there from the bottom of the boiler*," etc.

This was a *point* introduced by you, as we supposed, to draw attention to the fact that the way shown (in the first sketch) was not the proper manner in which to supply the first story bowl with hot water. We accordingly, so

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that no one might be misled, introduced the second sketch, showing the proper way to supply the bowl with hot water. At the same time we contended that, under *certain conditions*, hot water could be drawn at the wash bowl, and under these conditions we stated you could draw nothing but hot water. Now, do not mistake what these conditions are—"if the entire contents of the boiler are heated you cannot fail to draw hot water at the basin till such time," etc.

Now as to the communication of B., Vol. VI., page 85, to which you refer. We think you overlook the *point* that B. is contending for, viz.: that hot water "under some conditions" (and he very clearly states the conditions) can be drawn at the bowl first story.

We have carefully re-read B.'s letter and fail to find in it the idea which you seem to convey that "the doctrine put forward by B. is that an established circulation cannot be arrested." We can find no "doctrine" of this kind mentioned or even intimated. Neither can we find where a "virtual admission was made that only a little hot water could be drawn at the bowl and that from the bottom of the boiler." What we did say was when "water enough was drawn to displace the heated water below the return pipe," etc., and this does not intimate from which direction the hot water would flow, but we will now say that if the cold water supply to the boiler is of twice the capacity of the hot water or circulating pipe, and a faucet, also of twice the size of the hot water pipe (no matter where located on the line) be opened wide, the water will flow from the boiler through both the hot water and the circulating or return pipe to the open faucet, and this statement does not necessarily controvert that of B., wherein he says "opening the faucet simply allows a *portion* of this movement or circulation to vent itself out of the faucet."

There is, though, a statement in the last clause of B.'s communication, wherein he states, "Of course the pipe might be put so far down that no circulation would take place," which is not thoroughly explained.

The query would naturally arise, if the statement be true: How far below the boiler can the return pipe be placed and work? If it will operate at three feet below the boiler, why will it not, on the *same principle*, operate at six, ten, or twenty or fifty feet below? If the hot water pipe rise as far above the boiler as the return descends below, what is to hinder it from working?

There is also a *point* in J. T.'s letter, Vol. V., page 182, which some may question, "as the distance, according to the cut, is much shorter from the bowl to the boiler by way of the return pipe than through the hot water pipe." Now leave out the pipe *A*, as shown. Is not the distance of the hot water in the pipe directly over the bowl much less than "to the boiler by way of the return pipe?" Is not also the current travelling to the boiler by way of the return?

If distance were the only point to consider, the hot water would seem to have the best chance of success, as it is already on its travel toward the bowl, while the cold water to reach it must stop the established current and make the longer distance.]

AMOUNT OF RADIATING SURFACE.

MONTREAL, *Nov.* 30, 1882.

To the Editor of THE SANITARY ENGINEER:

How many feet of one-inch steam pipe radiating surface of the Nason form of radiator, will it take to give a temperature of 140° Fah.; the room is 26 feet 6 inches long, 15 feet 4 inches wide and 14 feet high; one side and one end exposed to the outer air, other side and end abutting on well-warmed rooms, walls of eight-inch brick, lathed and plastered on the inside; three windows, each 7 ft. 4 in. wide, fitted with double sashes. In the room sunk below floor is a plunge bath 16 ft. x 8 ft. x 5 deep. This will usually be full of cold water; sides of tank and floor are tiled. Steam pressure on boiler 10 pounds, fitted to work as a gravity apparatus.

Yours, J. W. HUGHES.

[If you use long, flat radiators (single or double rows) and place them on the outside walls, 200 Nason radiator tubes is about what would be required. There might be conditions which would raise the surface to 250 square feet, and then again with great precaution, such as drawing down window shades and closing some of the inside blinds, a test might be conducted which would give the required temperature with only 170 square feet. This does not take into consideration the effect caused by the plunge bath, and we think nothing but experiment will determine the extra surface required. It may be that the evaporation from the surface of the bath will require much extra heat, and then again if there is no ventilation the air may become heavily charged with moisture when a very small addition of surface will prove sufficient.]

LEAD BURNING.

PHILADELPHIA, PA., *Dec.* 7, 1882.

To the Editor of THE SANITARY ENGINEER:

I write to get from you, if possible, information as to the simplest and best lead burning machine, and the price of same. You will confer a great favor by sending an immediate answer. Yours respectfully,

JOHN WORTHINGTON.

[We understand an improved apparatus for lead burning has been devised by Mr. Thomas Walker, of Kansas City, Mo. His street address is No. 1310 Baltimore avenue.]

WET AND DRY COAL IN MAKING STEAM.

The New York *Tribune* states that a series of tests was made recently at Bochum, Germany, to determine the value of wet and dry bituminous coal in the making of steam. Washed slack, holding 18 per cent. of water and 9.9 per cent. of ash, evaporated 5.7 pounds of water per pound of fuel; while the same coal, with only 3 per cent. of water, made from 8 to 8.5 pounds of steam. Making due allowance for moisture by reducing to a standard of like quantities of coal, free from moisture, there is found to be a direct loss by using wet coal, of 14 per cent.

[Engineers who turn the hose on the coal heap to *make it burn better*, should consider well the above. If you reason with them they cite the custom of a blacksmith in wetting his coal to get a heat. The blacksmith wets his coal to coke it, and to make his fire solid, so as to direct the blast as he requires. A few of them have the idea they are burning *hydrogen* by so doing; but the intelligent men to-day know better.

We think, also, it would be well for the New York coal dealer to read the above and cover his coal in the yard, and not tell his customer, "The rain (water) improves the coal and makes the fire hotter."

To our own knowledge a ton of nut coal is capable of taking up 300 pounds of water, and even should we admit the coal dealer's argument to be true, we still think it would be better for the customer to get his coal dry and wet it himself.]

THE YONKERS NUISANCE.

The people of Yonkers, N. Y., appear to have become restive at last, under the neglect of the Governor to act on the report of the State Board of Health, with respect to the pestilent nuisance which exists in the heart of that thriving city. The *Statesman* wants to know "who is resposible for the apparent trifling with great interests, the State Board of Health, or Governor Cornell? The people who foot the bills, and suffer from ever threatening nuisances, ought to know."

So far as we are able to judge from the records of the proceedings in the matter of the Nepperhan nuisance, the tax payers of Yonkers are primarily to blame for the existence and continuance of this foul blot upon their city. Secondarily the Governor is to blame for not making an effort at least to compel the officers elected by the people to do their duty, and relieve their constituents of the discomfort and danger to which they are exposed.

The case is plain, and the responsibility cannot be shifted from the shoulders of the Aldermen and Health Board of Yonkers. The Board of Aldermen consists of eight members. Four of them have persistently refused to take the action which has been urged upon them by the Sewer Commissioners and approved by the other four Aldermen. On those four unreasonable and obstinate men will lie the guilt of the disease and death which are likely at any time to visit the dwellers on the lower part of the course of the Nepperhan River in its passage through Yonkers. This stream draining twenty-five square miles of rural country, and liable to extreme variations of flow, sometimes a mere rivulet, sometimes a raging torrent, enters the city of Yonkers pure. It leaves it, or more properly it stays along the last quarter of a mile of its course and the dock front on the Hudson River, a nasty stinking pool, charged with sewage from 6,000 people and the filthy suds and dye stuffs from the scouring and manufacture of about 10,000 pounds of wool daily.

There are over fifty houses and shops in the centre of the town, bordering on and directly over this stream, the filth and garbage from which are deposited directly in the stream, or when the water is low, lie stinking on its banks.

The Water Board, which is charged by law with the planning and construction of sewers, has long ago prepared plans for the thorough sewage of this district and asked the Board of Aldermen for authority to take the only step which can relieve the nuisance, the construction of sewers in the streets adjacent to the stream and the compelling of the inhabitants to make connection with those sewers. The four Aldermen refuse to do this. The reason for their action is stated to be that certain of their constituents are averse to being assessed for the cost of the sewers and think that the nuisance could be abated by making the stream nothing but a sewer and removing the half dozen dams which now give it a commercial value.

To support their views, they engaged the services of one of the most prominent hydraulic engineers in the country. His report showed that the cost of their idea would be enormous. So they simply fell back on their dog-in the-manger policy, and refused to do anything to save the dwellers within smelling distance of the foul stream from the sickening stench which it gives forth.

The City Board of Health, which is a composite body, made up of heads of different departments, appealed to the Governor, and he directed the State Board of Health to examine into the matter. They did so promptly, and on September ninth made their report to the Governor, recommending that he use every means in his power to cause the prompt abatement of the nuisance on the general plan which had been already laid out by the Water Commissioners. There the report still lies. Three months have elapsed and the Governor has made no sign. It has been rumored that there was doubt as to his constitutional power to order municipal authorities to exercise their charter powers in a specific manner.

The law directs that the Governor shall prescribe the manner in which a nuisance shall be abated, and the charter of the city directs which of the city officers shall perform certain functions. The constitutionality of an act was never tested by inaction. If the Governor has the power he should exercise it, in so plain a case as this. If he has not the necessary power, the sooner it is known the better, so that the law may be amended.

But pending the action of the Governor, the City authorities refuse or neglect to take any steps to help the citizens, although it is well-known that the recommendations of the State Board of Health were in accord with those of all the engineers who have examined the matter, and the opinion of the Water Commissioners.

If the Governor will not act, and the city authorities neglect to perform their manifest duty, we do not see that there is anything for the citizens of Yonkers to do, except to wait for the next charter election and then see to it that men with some sense of responsibility are put in office. Or possibly the new Governor who is familiar with nuisances in his own home, may be induced to take more interest in the matter than does the present one.

Whatever the result, several months of time of exceeding value for preparation for prompt and vigorous action in the spring, have been frittered away.

ERRATUM.

NEW YORK CITY, *Dec.* 15, 1882.

To the Editor of THE SANITARY ENGINEER:

In the last "Thermus" article, page 29, second column, near the top, it should read, "A pound weight of steam having very nearly the same heating properties, whether the pressure is one pound per square inch and with a bulk of (*sic*) 27 cubic feet, or fifty pounds per square inch with a bulk of—(*sic*) seven and one-third cubic feet."

Yours respectfully, "THERMUS."

Mr. H. C. Lowrie has been chosen City Engineer by the City Council of Denver, Col. The Denver *Republican* says his election will ensure an honest and capable administration in his department.

A correspondent complains to Dr. DeWolf, Health Officer of Chicago, that the ventilation of many school rooms, which are in basements of the public school buildings, or in unfit rented buildings, is so bad as to be dangerous to the school children. Dr. DeWolf admits that the complaint has foundation, but says the limited funds at command prevent the provision of fit accommodations. Even with such rooms as can be obtained, 20,000 children are out of school. Dr. DeWolf will make personal inspection of the schools, and recommend improvements in their ventilation.

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Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

NOVELTIES IN PIPE-FITTERS' TOOLS.

The following are among the new inventions of James H. Lancaster which the Lancaster Manufacturing Company, of 95 and 97 Liberty street, this city, are about to put on the market.

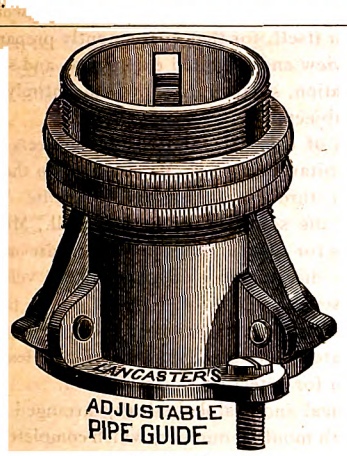

FIGURE 1.

Figure 1 represents an adjustable pipe-guide to be attached to a new form of die-stock, and to take the place of the solid "bushings" now generally in use. The die-stock we have not space to illustrate, but the peculiar features are, the method of adjusting the dies by turning one of the handles (which arrangement also permits the removal of the tool without turning back on the threads), and the provision for removing the dies for exchange or the insertion in their place of a pipe cut-off. Though intended to accompany the new style of stock, the guide may be attached to other styles. It consists of a cylinder or short piece of tube, having a flange around its base, through which screws pass to hold it to the face of the stock body; and of three pairs of ears or lugs in the angle between the flange and the surface of cylinder, in which are pivoted the guides, which play through slots reaching nearly to the top of the cylinder; together with a ring-nut (with milled edges for turning it by the fingers), threaded to the outside of the cylinder, and moving along the upper half. This moves all the guide-arms in through the slots toward the axis of cylinder with equal rapidity as it moves down, and centres the pipe or rod passing between them.

Figure 2 shows a "twin" pipe cutter. The advantages claimed for it are a wide range of sizes, a rapid adjustment, a true movement of the wheel carriers in parallel guides, securing a uniform cutting effect, and the removal of the burr and tapering of the end of the pipe, leaving it ready for threading, at the same time with the cutting. The latter is accomplished by a double-bladed tool, pivoted in a slot in the centre of the body, opposite the wheel. The method of adjustment is plainly shown in the figure. For the larger sizes a double handle is provided, screwing into the other end of the body, so that two men may work to better advantage than with a single handle.

Figure 3 represents an inside burr reamer, the first thing of the kind, we are told, that has ever been made as an article of merchandise. Heretofore, shops requiring them have them made to order for their special use. It consists of a long conical body fitting a large range of sizes, in the surface of which are inserted, and held in place by screws, either one or three cutters. It is turned by an ordinary tap wrench, or a small rod or tube.

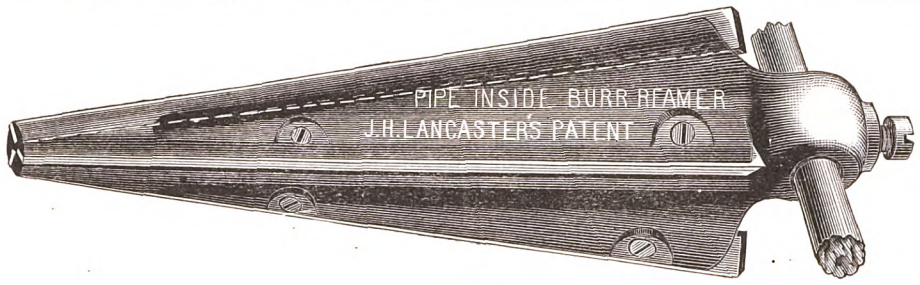

FIGURE 3.

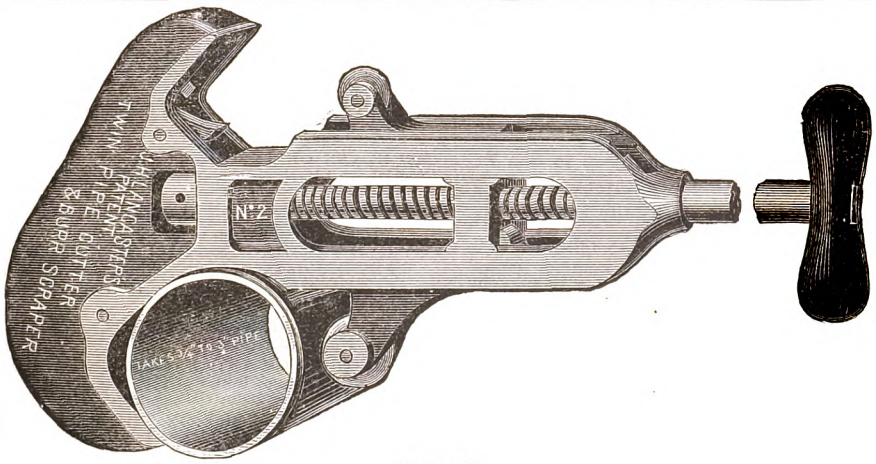

FIGURE 2.

PLUMBING LAW VIOLATIONS.

During the week ending December 18, eight violations, more or less serious, of the plumbing law were reported to the Board of Health by Inspector Hooper, three by Inspector Hollick and two by Inspector Golden.

BROOKLYN PRIZE SCHOOL HOUSE PLANS.

The time for the reception of plans in competition for the prizes offered by Mayor Low, of Brooklyn, expired November 20, but owing to difficulty in getting together all the members of the committee of award, the result has not yet been announced. We understand the committee are to meet this week, and we hope to report their decision in our next issue.

The Tappan School, in East Boston, has been closed until January, on account of the wretched condition of the building. We recently noted the reports circulating about this building, and are glad to see that the School Committee have acted with promptness in the matter.

The danger of sending children threatened with diphtheria by having sore throats, to a school among 40 or 50 children in an imperfectly ventilated school room, is made the subject of a recommendation by the Philadelphia *Bulletin* that parents and others to procure the rules lately proposed by the Board of Health, and to have them left at every house in that city.

Judge Walling, of the Monmouth County Court, on application of the Public Prosecutor, has issued an order commanding the Commissioners of Long Branch, the Commissioners of Asbury Park, the Ocean Grove Association, and the Ocean Beach Association to show cause why they should not be required to plead to the presentments found by the Grand Jury and recently filed, respecting the allowing of sewage to pass into the waters of Long Branch Brook, Wesley and Sunset Lakes, Shark River, and other adjacent waters to the Atlantic coast, all of which are under the jurisdiction of the court.—*Newark Journal.*

After a spirited contest, the Medico-Legal Society, Dec. 6, re-elected Clark Bell, their President. The other officers elected were as follows:—R. Ogden Doremus, and Delano C. Calvin, Vice-Presidents; L. P. Holmes, Secretary; Gilbert R. Hawes, Assistant Secretary; Moritz Ellinger, Corresponding Secretary; Dr. Andrew H. Smith, Curator and Pathologist; R. S. Gurnsey, librarian; Dr. E. H. M. Sell and Benjamin A. Willis, trustees; Dr. Morris H. Henry and A. G. Hull, members of the permanent commission. Dr. O. W. Wight, of Detroit, Mich., presented a paper, read by title, on Experts and Expert Testimony.

At Indianapolis, on the 13th inst., the annual convention of the Indiana Tile and Drainage Association was held. The Presiding officers were: President, Robert Thomas, of Indianapolis; Recording Secretary, J. B. Macy, of Russellville, and J. J. W. Billingsby, of Indianapolis, Corresponding Secretary. Gov. Porter delivered the opening address. Prof. H. W. Wiley, of Perdue University, introduced the subject of "Clays." Dr. R. T. Brown, of Indianapolis, spoke on the "Effect of Drainage on Soil," and W. A. Armstrong, of Rossville, Ill., on "Experiences in Drainage." The attendance was from Ohio, Michigan, Illinois, Iowa and Missouri, with 150 members of the State of Indiana.

The discussion among railway men, the past year, about the practicability of holding a national exposition of railway appliances, has resulted in a determination to give the plan a test next spring. Arrangements have progressed so far that the Inter-State Exposition buildings near Chicago have been secured and the date of opening set for on or about May 31, 1883. The carrying out of the scheme is in the hands of a Board of Commissioners composed of the following gentlemen: Lucius Fairchild, ex-Governor of Wisconsin and late Minister at Madrid, Spain; George M. Pullman, President Pullman's Palace Car Co., Chicago; Aaron French, Pittsburgh Car Spring Co., Pittsburgh; J. McGregor Adams, Adams & Westlake Manufacturing Co., etc., Chicago; E. V. Cherry, Vice-President Post & Co., Railway Supplies, Cincinnati; A. G. Darwin, President Allen Paper Car Wheel Co., New York; O. W. Potter, President North Chicago Rolling Mill Co., Chicago; H. E. Sargent, late General Manager Northern Pacific R. R., Chicago; James McMillan, President Michigan Car Co., etc., Detroit; George Westinghouse, Jr., President Westinghouse Air Brake Co., etc., Pittsburgh; J. H. Bass, Proprietor Bass' Car Wheel Works, Fort Wayne; E. H. Williams, Baldwin Locomotive Works, Philadelphia; Wm. S. Eaton, National Tube Works Co., etc., Boston.

During November the total number of nuisances reported to the Board of Health of Philadelphia, Pa., was 526, of which 329 were found to be detrimental to the public health, and 98 were dismissed by the Board. A number of fines were imposed on various persons and corporations for violating rules of the Board.

The health of children at Rochester is to be protected from diphtheria prevalent there, by excluding those residing in houses where cases are found from attending schools and by a quarantine of the diphtheritic cases.

Lieut.-Col. Bolton, Water Examiner for London, again points out in a report on the water supply of the metropolis the past year that the quality of the water used in domestic consumption depends very much upon the care taken by the consumer to guard against its contamination after it has been distributed from the mains. Foul cisterns and defective or misplaced communication-pipes, are, as might be expected, fertile sources of impurity.

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IS THIS A CASE OF PLAGIARISM?

To the Editor of THE SANITARY ENGINEER:

In the supplement to your issue of Dec. 7, you give very full abstracts of the report of Mr. Samuel A. Robinson, the Inspector of Plumbing of the District of Columbia, to the Health Officer of the district. Being interested in every movement intended to improve the usual faulty condition of plumbing work in city houses, I began to read the report with considerable interest, but was soon quite surprised to find in it sentences quite familiar to me. Upon further examination I found that Mr. Robinson had made extensive use of my report on "House Drainage and Sanitary Plumbing," made this summer to the Rhode Island State Board of Health, and published in its Fourth Annual Report.

Had Mr. Robinson observed the most ordinary courtesy of giving credit to writers from whom he quotes, it could, perhaps, have been considered a compliment that an American should use in a report expressions and sentences, written by a foreigner, who has been but a few years in this country. But Mr. Robinson has chosen to use not only many of my sentences, slightly changing some by leaving out words or substituting one word for its synonym; he has also used matter from other writers *quoted in my report* without mentioning the name of the author. It seems to me that such a violation of the usual custom of compilers deserves the strongest condemnation of your paper and all its readers. This seems to me to be a piece of flagrant plagiarism, and as you have devoted considerable space in your columns to the review of this report, it would be but just to me that the facts in the case should be made public.

In support of the above, I quote below in juxtaposition, extracts from both reports.

MR. GERHARD'S REPORT.	MR. ROBINSON'S REPORT.
1. The earthenware drain should end at about five to ten feet outside of the foundation walls of the house. From this point towards the inside of the house the drain should be of iron. The joint between iron drain and earthenware pipe should be made with pure hydraulic cement. Where the iron pipe passes through the wall, a relieving arch should be built over it. Settlement of walls often occurs, and is liable to crack the pipe or even break it, unless the above provision is carried out. It is quite evident that, under no circumstances whatever, this part of the house drain should consist of vitrified pipe. Important as it is to have the drains outside of the house free from sediment or leakage, it is still more so to have all the pipe joints inside of the dwelling perfectly air and water tight, etc.	1. The earthenware drain should end at about five (5) feet outside of the foundation walls of the house; the joint between the iron drain and the eathenware pipe should be made with pure hydraulic cement, and where the iron pipe passes through the wall, a relieving arch should be built over it to prevent the pipe from being broken by the settlement of the walls, which often occurs. Important as it is to have drains outside of the house free from sediment or leakage, it is still more so to have all the pipe joints inside the house perfectly air and water tight, etc.
2. In order to effect a constant movement and change of air in the pipes two openings are required, an outlet and an inlet. The extension of the soil pipe through the roof provides only an escape for the foul air generated in the soil pipes and waste pipes through the decomposition of foul organic matter clinging to the interior of pipes and lodging in traps under water closets and fixtures. But in order to oxidize and thus render harmless this matter undergoing putrefaction within the pipes, a constant introduction of fresh air from the outside atmosphere is necessary. As the soil pipe is warmer in winter time (being in the constantly heated house) than the fresh air pipe located outside of it, an almost constant upward current in the soil pipe results. In summer time this current is only seldom reversed; for, as a general rule, the top of soil pipe is heated by the sun more than the fresh air pipe near the ground.	2. In order to effect a constant movement and change of air in the pipes two openings are required, an outlet and an inlet. The extension of the soil pipe through the roof affords an escape of the foul air generated in the sewer by the decomposition of foul organic matter clinging to the inner surface of the pipes. In order to render harmless this matter undergoing putrefaction, a constant introduction of pure air from the outside is absolutely necessary; and, as the soil pipe is warmer in winter (being in the house) than the fresh air pipe located near the ground in front, the result is an almost constant upward current in the soil pipe. This I have found to be the case even with the soil pipe on the outside of the house, for the reason that it is heated more by the sun than the fresh air pipe near the ground.
3. A trap is practically a suitable bend or dip in the drain, which retains a sufficient quantity of water to prevent the passage of air or sewer gas from the sewer to the house drain.	3. Most persons are familiar with the running trap, which is practically a bend in the drain, holding a sufficient quantity of water to prevent the passage of air or sewer gas from the street sewer to the house drain.
4. It is the purpose of this paper without in any way adding to the "plumbing scare," clearly to define wherein the danger consists, but at the same time to establish rules for the proper drainage and plumbing of houses, which, if carefully observed, will secure to the anxious house owner work of superior quality and of a positively safe character. * * * * Even a small house is nowadays generally provided with a kitchen sink, a water closet and sometimes a bath tub, while in a costly modern residence, arranged with an elaborate system of plumbing, we find kitchen, pantry and scullery sinks, slop sinks, laundry tubs, stationary wash basins in closets near bedrooms, a great number of bath or dressing rooms, with water closets, urinals, bath and foot tubs, bidets and other fixtures. The suggestions and recommendations of this report apply with equal force to the drainage and plumbing of tenements, small houses, costly residences, villas, apartment houses, hotels, factories, school houses or public buildings.	4. The law now requires every new house to be connected with the sewer, and consequently even a small house is generally fitted up with a kitchen sink, a water closet, and sometimes a bath tub, while in a more expensively built residence, arranged with a more costly system of plumbing, we find in addition to the above, stationary washstands, near sleeping apartments, a number of bath and dressing rooms, having in them water closets, urinals, foot tubs, bidets and other fixtures. The regulations of this department apply with as much force to the drainage and plumbing of small houses as they do to the most costly residences. The same protection is given to all, and as these rules have been established for the proper drainage and plumbing of houses, the public may rest assured, that, when they are carefully observed and strictly complied with, there can be no danger of escape of sewer gas or foul odors in their dwellings.
5. The foulest part of the pan closet is the receiver, for the solids gradually accumulate on its sides, as these receive no washing from the flush. The filth soon undergoes decomposition, and the resulting gases, having been confined by the double water seal of the pan and the trap, are expelled into the apartment at each use of the closet. * * * * * * * Some of the enumerated defects may be remedied; by enameling the inside of the cast iron receiver; by ventilating it by an inlet pipe for fresh air and a vent pipe; by having special flushing arrangements for the container. * * But by all these costly improvements the *only* merit of the pan closet, its cheapness, is annihilated, and a better water closet may as well be used. As long as a house is fitted with pan closets of whatever pattern, it may be said not to have reached the standard of safety from a sanitary point of view.	5. * * * but I must not omit to say that a house fitted up with a pan closet of whatever pattern, in a sanitary point of view, is unsafe, no matter what care has been taken to ventilate the soil and waste pipes. The most offensive part of the pan closet is the receiver or cast iron container under the bowl, for the solids gradually accumulate on its sides; this filth soon undergoes decomposition, and the gases that are confined between the pan and the trap escape into the apartment whenever the closet is used. To remedy all the defects of the pan closet by enameling, ventilating containers and having special flushing arrangements, would make it more expensive than any of the modern closets now in use.
6. The following valuable remarks of Mr. Edw. S. Philbrick upon this subject so fully express my own views, that I quote them *in extenso.** * See articles on "Domestic Sanitation" in THE SANITARY ENGINEER, Vol. II. "The location of plumbing fixtures in dark corners, under stairways and in closed closets is always to be avoided," etc. * * * "The less amount of woodwork the better," etc. * * * "It may not be always possible to to enforce such discipline, but the less it is enforced, the more important become the items of light, air and simplicity of construction, as aids in the same direction. The latter are generally under the control of the architect, and his mistakes of planning entail a *permanent* and incurable evil," etc., etc. * * * * "While every aid should be given to cleanliness by simplifying the apparatus, no amount of perfection in this respect will avoid the need of constant thought and care on the part of those who use the fixtures," etc.	6. The less amount of woodwork about set figures, of any kind, the better, and every aid should be given to cleanliness by having them exposed to light and air. This is generally under the control of the architect, whose mistakes in planning have been the cause of incurable evils, and much unnecessary trouble to house keepers in so boxing fixtures as not to admit of frequent and thorough scrubbing. The location of plumbing fixtures in dark corners, under stairways and in closed closets, should always be avoided.

All this occurs not in a private report, but in an *official* report of a *public officer*.

Very respectfully, yours, WM. PAUL GERHARD.

NEWPORT, R. I., *Dec.* 9, 1882.

[Our abstract of Mr. Robinson's report was made from a written copy sent to us by him. Whether in the report sent to the Health Officer he made any acknowledgments of the value Mr. Gerhard's reports had been to him we have no means of knowing, as it has not yet appeared in print. That it has been of service is quite evident. In justice to Mr. Robinson, it should not be forgotten that the principles of house sanitation were the common property of sanitarians long before either Mr. Gerhard's or his report was written. All have been known and held in common for at least 10 years, and many for 30 or 40, and and it is not now possible for writings on the elements of the subject, such as these two reports are, to be in any considerable degree original; and any man competent to occupy such a position as inspector of plumbing is, as a matter of course, familiar with such facts as are mentioned in the Report on the Plumbing of the District of Columbia. Mr. Gerhard was careful to give credit when he quoted another's language, and we can appreciate his feelings, since we, almost every week, see our own matter appropriated without credit given. We hope Mr. Robinson may be able to explain his apparent want of fairness.]

Reviews of Books.

JOURNAL OF THE ASSOCIATION OF ENGINEERING SOCIETIES. Boston, St. Louis, Chicago, Cleveland. Vol. I, November, 1881, to October, 1882. Published by the Board of Managers of the Association of Engineering Societies.

This volume of 430 pages comprises fifty-five papers on engineering subjects contributed to the four societies which unite in publishing their proceedings. The selection has been, in general, judiciously made by the managing committee and the result is an interesting and valuable addition to current engineering literature. The co-operation of the societies in this matter has, of course, reduced the cost and ncreased the circulation of the papers, which having been read before local societies of comparatively small membership could not well have been published except by such co-operation. There is, of course, a great variety in the topics treated and in the value of the papers. Generally they are practical and to the point. The greatest deficiency is in discussions of the papers by members other than the authors. There does not seem to have been any discussion or remarks on the great majority of the papers here printed. Indeed, some of them were never read at a meeting of engineers, except by title, and of those which were read and discussed, but few and meagre memoranda of the discussions are printed. It is no disparagement of the papers themselves to say that their value would be immensely enhanced if the discussions by those who heard them read and the author's replies were given in full. It is not uncommon for the criticisms or explanations of a paper read before an association of civil engineers to be worth more than the paper itself, for that is frequently prepared from one point of view and a limited experience, and sometimes cross examination, so to speak, puts an entirely different face on the subject.

The papers of especial interest to engineers who are engaged on sanitary work are, Mr. Fteley's on the percolation of water through sand, Mr. Benezette Williams' description of the sewerage of Pullman, Ill., Mr. Robert Moore's tables for determining the proper size of sewers, Mr. Gerhard's diagrams for determining the velocity and discharge in sewers, and Prof. Nichols' on the tastes and odors of some surface waters, Mr. Kingley's on water wastes and water meters and Mr. Brackett's tests of the Deacon system for detecting waste of water.

A good topical index alphabetically arranged is issued with the twelfth monthly number, which completes the first volume of this commendable enterprise of the local engineering clubs.

The *Wide Awake* for December is particularly good. One of its frontispieces, represented by a steel engraving, is the beautiful group of "Mother Child and St, John," from Bougereau's painting. Rose Terry Cooke writes a story called "A Case of Coincidence"; Eggleston, Ed. Everet Hale, Celia Thaxter, Mrs. Whitney, Tennyson, Christina Rosetti, all contribute. There are illustrated papers for boys about "Health and Strength," by Prof. Sargent; on "Eversly Dogs," by Rose Kingsley; "The Microscope," Samuel Wells; "The Workshop," "Christmas Carols," Geo. L. Osgood; "Cookery," Marion Harland; Stories about the Chinese and the Quakers, and illustrations are to be found throughout the number.

BOOKS RECEIVED.

TRANSACTIONS OF THE SANITARY INSTITUTE OF GREAT BRITAIN, 1881-82, Vol. III. Henry C. Burdet and F. de Chaumont.

CIRCULARS OF INFORMATION OF THE BUREAU OF EDUCATION, No. II, 1882. Washington: Government Printing Office.

ANNUAL REPORT OF THE SECRETARY OF WAR for the year 1882. Washington, Government Printing Office, 1882.

OSTRICH FARMING IN THE UNITED STATES. Published by the Department of State. Washington, D.C., 1882.

SMALL-POX IN CALIFORNIA, 1880 and 1881. By F. W. Hatch, M.D. Sacramento, 1882.

THE SEA SIDE HEALTH RESORTS OF CALIFORNIA. By F. W. Hatch, M.D.

BUILDING GUIDE AND ESTIMATING PRICE BOOK. By Fred. T. Hodgson, Editor of the "Builder and Wood Worker," New York. The Industrial Company, 1882.

PRELIMINARY REPORT ON THE YELLOW FEVER EPIDEMIC OF 1882 IN THE STATE OF TEXAS. Treasury Department, Marine Hospital Service.

TENTH ANNUAL REPORT OF THE N. Y. COUNTY VISITING COMMITTEE FOR BELLEVUE AND OTHER PUBLIC HOSPITALS. Presented to the State Charities Aid Association, May 11, 1882.

ABLEITUNG DES REGEN WASSERS AUS STADTEN, MIT HINBLICK AUF DIE BERLINER KANALISATION. Skizze von M. Knauff, Stadt-Baumeister, Berlin, 1882.

BERICHT UEBER UNTERSUCHUNGEN VON SPUELJAUCHEN, vor und nach der Behandlung in dem Reinigungsverfahren Von Canalisationsabwässem, patentirt dem Herrn Dr. Friedr. Petri.

IS TUBERCULAR CONSUMPTION A CONTAGIOUS AND PARASITIC DISEASE? A paper by Bela Cogshall, M.D., of Flint, Mich.; read at the tenth annual meeting of the American Public Health Association at Indianapolis.

WATER ANALYSIS A HANDBOOK; FOR WATER DRINKERS. By G. L. Austin, M.D., Boston: Lee & Shepherd, New York: Charles T. Dillingham, 1883; pp. 48.

THE THEORY OF THE GAS ENGINE. By Dugald Clerk. D. Van Nostrand & Co., New York, 1882.

CLEARANCE CATALOGUE. R. Worthington, Book Publisher, New York.

ROYAL INSTITUTE OF BRITISH ARCHITECTS PROCEEDINGS, 1882-1883.

ANNUAL REPORT OF THE SUPERVISING SURGEON-GENERAL OF THE MARINE HOSPITAL SERVICE OF THE UNITED STATES for the year 1880.

We here acknowledge receipt of advance sheets of MEDICAL COLLEGES, from Fourth Annual Report of the Illinois State Board of Health.

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Construction Notes.

We shall always be glad to receive items of interest for this column.

CONTRACTS AWARDED.

JERSEY CITY.—The contract for cleaning the streets has been awarded to Patrick Sheeran for $17,995.

NEW YORK.—A second contract for dredging Buttermilk channel has been awarded by Gen. Newton to Henry Dubois for 25 cents per cubic yard, the work being limited to an expenditure of $60,000, the amount of the appropriation.

CHICAGO.—The Commissioner of Public Works has re-advertised for bids to furnish all the fire hydrants and stop-cocks needed by the city. Two bids had been received, each for the same amount $49.50 a ton, from J. H. Bass, and the Union Foundry & Pullman Car Wheel Works Co. The Union Foundry & Pullman Car Wheel Works Company has received the contract at $45 a ton, for special castings for city water pipes. Last year about $6,000 was paid out for this purpose.

Proposals were received to furnish new City Hall with a fire alarm telegraph wire tunnel; engine room floors and boiler room floors as follows:—

Angus & Gindeh	$5,985
Wm. Manson	6,293
E. G. Gobel	6,493
Robinson & Minor	6,570

The Contract was awarded, December 14, to Angus & Gindeh.

COLUMBUS, O.—Bids for slate tiling and base for the new asylum for Imbeciles were received by the Board of Trustees, Dec. 7, as follows:—Star Encaustic Company, of Pittsburg, tile floor, $10,330; W. R. Kinnear & Co., of Columbus, slate floor and slate base, $21,792; Great Western Marble Works, Cincinnati, slate floors, $11,893.09, and slate base, $2,100; American Encaustic Flooring Company, of Zanesville, tile floors, $7,558 20, and slate base, $2,400; United States Encaustic Company, of Indianapolis, tile flooring, $7,385, and slate base, $1,736; Henry Dibblet, of Chicago, representing Maw & Co., England, slate floors and base, $10,500, and for encaustic tile floor and base, $9,350.

HOT SPRINGS, ARKANSAS.—Bids were received at the office of the Secretary of the Interior, December 15, for excavation, building wall of granite masonry, laying concrete, and furnishing and laying 12-inch earthenware and 6-inch iron pipe. Omitting bids for granite masonry, concrete and excavation. Those for the pipe were as follows:

	12 in. earthenware pipe, per lin. ft.	*6-in. iron pipe, per lin. ft.*
Carl Miller & Patterson, St. Louis, Mo	$1.50	$1.25
Aldrich Welshbellic & Co., Hot Springs	1.25	1.50
John McKim, New York City	1.20	1.40
C. W. Frey	.85	1.25
Dillow & Wherry, Little Rock	.65	2.00
D. Pullman, Opposition, Ark	.98	2.00
G. Eyerman, St. Louis	.77	1.45
J. H. Dewes, Washington, D. C	terra cotta .29	.99
M. A. McGowan & Co., Washington, D. C.	1.60	1.90
A. P. Robinson	.90	.55
P. Maloney and Jas. Reynolds	terra cotta 1.50	1.40
Hecox & Martin	1.00 for T's and 2.00 for ventilators .60	1.85
Henry Farrell	.62	1.75
Gustav Wilke & Co	.80	1.50
John Burnes	3.00 ven. .80	3.00
G. C. Rumbough	each, T's 2.60 .62	1.95

No award is yet made.

BROOKLYN.—The contract for heating and ventilating public school-house No 7 has been awarded to the H. B. Smith Co., of New York, for $4,865, Other bids were as follows:

Gold's. Heater Manufacturing Co	$4,978
E. Rutzler	5,735
Bates & Johnson, without boilers	3,750

DISPUTE OVER BIDS FOR PLUMBING MATERIALS IN BOSTON.

The action of Assistant Treasurer Kennard in allowing a bid to be received for plumbing the post office extension after the hour for closing the bids, as reported in the morning *Herald*, is severely denounced by those firms who had their bids in at the time specified in the advertisement. A member of the firm of Dalton & Ingersoll, one of the firms who bid for the contract, says he was present and remonstrated with Mr. Kennard, informing that gentleman that he didn't consider it a fair way of doing business; that the hour announced for closing the bids was 12 o'clock, and that no bids should have been received after that hour; that there was ample opportunity for some one to catch the figures as they were called out, and then make up a set of figures and present them. It was stated that Mr. Kennard announced that, as the recording of the bids was in progress, it was not too late to receive a new bid, but on this point the gentleman says that the recording had been finished before the arrival of the new bidder.

The following communication is self-explanatory:

"OFFICE OF PHILLIPS & WEEDEN,
84 NORTH ST., BOSTON, *Dec.* 13, 1882.

To the Editor of the Herald:

In this morning's issue of your paper we find an article in regard to the bids for plumbing material required for the "new post office and sub-treasury extension," and, as the article reflected upon us (the lowest bidders) we feel obliged to make a statement in reply to certain rumors circulated by a competitor. In regard to the award we await the decision of the authorities, knowing it will be based upon the facts and figures, unbiassed by a disappointed bidder. The fairness and freedom from fraud of our bid was only questioned by one firm, and they a direct competitor in our line of business, and at this writing we have heard nothing from the other bidders. The assertion that a sign or communication was given us by the government officials is so absurd as to be unworthy of notice, and the high character they bear and esteem in which they are held will permit no one to entertain such a thought. The gentlemen are strangers to us, we never having met them. It would have been impossible to have altered our bid at a short notice, as it was written on four pages of long bill paper and the price of each article and the gross amount for the quantity of each article was extended separately. On reference to our bid, no erasure of any kind will be found. Trusting you will find space for this letter with the accompanying affidavits, we are, very respectfully,

"PHILLIPS & WEEDEN."

Accompanying the above letter are sworn statements of the firm, in which they state that they made up their figures prior to handing them to the assistant treasurer, and wrote upon the proposals the following memorandum: "We will furnish above goods for $9,924 36. Phillips & Weeden."—*Boston Herald.*

(Continued to page 63.)

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Vestry st, No. 37 br storage warehouse; cost $14,000; o; Wm. Menck; a, Geo. W. da Cunha....East Houston st, No. 402 and 293 2d st, brick ten and store; cost $9,000; o, Henry Merck; a, J. Kastner....West st, n e cor Hubert st, one br store and office building; cost $12,000; o, John H. Carsten; a, Wm. E. Bishop....34th st, s s, 80 e 3d av, four br ten; cost each, $16,000; o, and b, John Fish; a, W. Jose....Lexington av, s w cor 53d st, three br and stone flats; cost $45,000, $40,000 and $20,000; o, John Davidson; a, A. B. Ogden ... Madison av, w s, 25.5 s 65th st, br riding school and stables; cost $30,000; lessee, F. W. Bach; a, Raymond Huber....81st, s s, 100 e 5th av, eleven br stone dwel; cost ea $28,000; o, W. P. & A. M. Parsons; a, Thom & Wilson; b, days work....4th av, n e cor 123d st, four br ten; cost, corner, $25,000, inside, each, $20,000; o, George W. Rogers; a, W. J. Merritt....Av A, e s, 51 n 72d st, br ten; cost $10-000; o, and b, Henry Reihl....122d st, n s, 66 w Av A, two brown stone dwel; cost $9.500; o, John H. Gault; a, R. Rosenstock.

ALTERATIONS, NEW YORK CITY.

56th st, 88 e, repair damage by fire, cost $2,500; o, Catharine Cronin; a and b, John D. Miner ...Hudson st, 57 and 59, rebuild foundation, piers, etc., cost ——; o, American Express Co.; b, D. M. Smith....28th st, 26 and 28 w, altered, cost ——; o, Horticultural Society; a and b, S. Griffith....West Houston st, 173, raised one-story, cost $3,500; o, Daniel Rosenbaum; a, J. Boekell....18th st, 236 and 238 w, iron beams, girders, etc; cost $12,000; o, Macpherson and Donald Smith; b, J. Huson and D. Wilkie....12th st, 205 e, extension to five stories, cost ——; o, Edward Lange; a and c, Burke & Fagan; m, John Murphy....Broadway, s e cor 29th st, repair damage by fire; cost $8,000; o, A. P. & J. D. Sturtevant; b, James Thompson and J. H. Studley.

BROOKLYN.

Prospect pl, s s, 355.5 w 6th av, two brown stone ten; cost ea, $6,000; o, a, and b, G, W. Brown....Clinton av, e s 186.8 s Lafayette av, br dwel; cost $35,000; o, Wm. H. Hill; a, G. L. Morse; b, Owen Nolan ...Nostrand av, s e cor Hart st, four fr dwel; cost ea, $4,500; o, and b, Thomas E, Greenland; a. I. D. Reynolds ...Kent ave, e s, 350 Myrtle av, br ten, cost $6,000; o and a, John Reis; b, Thos. Baker and Williams Bros.....Myrtle av, n f, 134 e Kent av, br store and dwell. cost $8,500; o, Peter Clark; a and b, E. Van Voorhis.... Kosciusko st, s s, 91 w Sumner av, nine fr dwell, cost total $29,700; o, Chas. I. DeBevoise; a and b, Marinus & Gill....Sumner av, s w cor Koscuisko st, five fr dwell, cost total $16,500; o, a and b, same as last ....Lafayette av, n s, 20 w Sumner av, three fr dwell, cost total $10,-000; o, a and b, same as last....Pier bet 26th and 27th sts; two brick storage houses, cost ea $30,000; o, Brooklyn Water Front Warehouse & Dry Dock Co; a and b, Meeker and Hedden....Nostrand av, s e cor Lexington av, five b s, one store and three ten, cost ea about $6,500; o, Wm. J. Northridge; a and b, Rulef Van Brunt.

BALTIMORE, MD.—Belair av, e s, 2 br build; o & b, F. C. Fossett.... Madison av, e s, 8 br build; o and b, W. L. Stork....Patterson av n s, br build; o, J. Boyce....Druid Hill av, e s, 7 br build; o and b, Wm. G. Scarlett....Gilmore st, e s, 1 br build; o, Wm. Diven .. Orleans st, 2 br build; o, W. Harn....Gilmore, n w cor of Mulberry st, 7 br build; o and b, W.E. Phillips....Mount st, w s, 7 br build; o and b, J.B. Irvin... Mount st, w s, 7 br build; o and b, T. B. Irvin....Prestman st, n e, 4 br build; o and b, J. Fox.... Chesapeake st, w s, 7 br build; o and b, J. N. Foss....Laugerne st, w s, 5 br build; o and b, E. W. Gowman....Sterret alley, e s, o and b, S. McGowan ...McKinn st, e s, 4 br build; o and b, J. Beachman .. Lombard, n s, 1 br build; o, Chas. Vogler....Fulton av cor Mosher, 10 br build; o and b, L. H. Robinson....Robinson st, w s, 4 br build; o and b, A. Weiskittle. ..Fulton ave, e s, 17 br build; o and b, John Fox....Larman st, s s, 2 br build; o and b, W. J. Beach....Broadway and Biddle st, s w cor, stone church; o, Faith Prest. chapel....Penna av, 2 br build; o and b, C. F. Richter..Bloom st, s s, 1 br build; o and b, W. L. Stark.. Hanover st, e s, 26 br build; o and b, G. W. Hooper ...Jephson st, e s, 4 br build; o and b, G. W. Hooper....Moulalley st, e s, 16 br build; o and b, G. W. Hooper... Lorman st, s s, 5 br build; o and b. B. Fear....Bruce alley, e s, 10 br build; o and b, Fear & Herner....125 Montgomery st, 1 br build; o and b, G. A. Downs ....Nicholon and Decatur, 1 br build; o, B. F. Haynes... Ann st, e s, 20 br build; o and b, Gang & Cuny .... Valley st, e s, 1 br build; o, W. Butzler Valley st, e s, 1 br build; o, W. Heyeser.. Washington and Jefferson st, br build; o, Sherman & Harmeman Chester st, e s, 6 br build; o, L. Turnbull....Baltimore st, n e, 3 br build; o, Mrs. Jane Kelso....High and Hillen, n e cor, 1 br build; o, W. M. R. R.

BRIDGPORT, CT.—State st, fr dwel; cost $6,000; o and b, I. W. Day; a. G. E. Potter....Main st, br dwel; cost $8,000; o, A. S. Parsons; a, H. Lambert... Atlantic st, block 3 houses; cost $10,000; o and b, H. M. Purdy; a, H. Lambert....Prospect st, br dwel; cost $6,000; o, H. H. Scribner; a, Pallaser....Prospect st, double h; cost $8,000; o, O. Alvoid.

CHICAGO, ILL.—205 Madison st, br st; cost $30,000; o, Jonathan Clark; a, Burling & Whitehouse; b, Rosler & Wickler....116 Superior st, br st and dwel; cost $7,000; o, M. Brand; a, C. H. Gothig; a, C. Helman....Lake Park av, 3 st and br dwel; cost $30,000; o, Dr. H. Merckle; b, Hy. Apple....746 Van Buren st, br st and dwel; cost $5.000; o, C. S. Tyrrell....3630-36 State st, 4 br st and dwel; cost $20,000; o, Philip M. Thompson; a, T V. Wadskser; b, Thomas Morse and Andrew Elmers... 3821 Lake av, br dwel; cost $6,000; o, E. Willams; a. W. L. Jenny; b, T. C. Williams ....103-105 Hoyne av, br dwel; cost $10,000; o, James Sinclair ....85 Walton pl, br flats; cost $6,000; o, Aug. Lutz....265 Wells st, br flats; cost $8,000; o, Samuel Burnett; a, C. M. Palmer; b, J. Terborgh....Groveland Park; b st dwel; cost $6,500; o, Charlotte M. Borden; a, Hy. F. Starbuck....Groveland Park, b st dwel, cost $6,500; o, Flora Sellick; a, Hy. F. Starbuck....41 South Water, br b for restaurant and storage; cost $11,000; H. P. Schilling; a, E. Baitman; m, Chas. G. Mueller; c, M. S. Williams....Lake Park av nr 13th st, br dwel; cost $10,000; o, F. W. S. Brawley; a, W. A, Furber; b, J. Griffiths....27th st e of Cottage Grove av, 4 br dwel; cost $16,000; o, W. F. Myrick; a, Cobb & Frost; b, T. G. Goodfellow....Rhodes av, st dwel; cost $9,000; o, J. Foster Rhodes; a, L. G. Halberg; b, Martinsen & Ottesen Twelfth and Oakley av, br st and flats; cost $5,000; A. T. Ewing; a, Treat & Foltz; b, A. Bennott....265 Wells st, br flats; cost $8,000; o, Samuel Burnell; a, S. M. Palmer; b, J. Terbargh.

DETROT MICH.—Michigan av, br st, cost $5,000; o, J. D. Standash ....847 Jefferson av, br dwel; cost $15,000; o, A. E. French,... 571 Woodward av, br dwel; cost $15,000; o, A. Chapston.... Larned East, br dwel; cost $5,000; o, A. Chapston....18th st, add to shop; cost $3,600; o, Hargraves Man'f'g Co....646 to 664 Fourth st, 6 fr dwel; cost $14,000; o, S. J. Martins....278 Russell st, add to br dwel; cost $2,600; o, M. Roberts & Son....Howard st, 219, br add to dwel; cost $3,000; o, Kischner & Co....33 and 35 Peterboro st, 2 br dwel; cost $9,000; o, M. A. Edwards.... Bedford and Groves st, 6 fr dwel; cost $4,000; o, B. M. Knowles & Son.

PHILADELPHIA, PA.—Van Pelt, w of Berks, five b dwells; J. R. Pyle....Somerset, bet 11th and Mervine, six b dwells; o, Joseph Lomax....Thompson st and Mongomery av, four b dwells; b, J. J. Hill ... Washington av 23d st, br cooper shop; b, Thos. Little.

RAVENSWOOD, ILL.—Fr dwel; cost $10.000; o, D. P. Brown; a, Jno. P. Huber; b, R. W. Grunow....fr cottages, $5.400; o, T. B. Jeffrey; a, Jno. P. Huber; b, Grunow & Condit....fr dwel, cost $9,000; o, H. H. Anderson; a, Jno. P. Huber; b, W. Van Horne ....Fr dwel; cost $7,000; o, Frank Field; Jno, P. Huber.

ST. LOUIS, MO.—Dickson st, bet Clay st and Glasgow av, br dwel; cost $6,500; o, Mary Meyer; a, Wm. C, Schaper; c, sub-let.... 11th bet Monroe and Clinton sts, br dwel; cost $5,500; o, T. Silence; a, Thos. Annan; c, J. P. Evans....Dayton st bet Clay st and Elliot av; br dwel; cost $9,500; o, H. S. Parker; a, W. C. Slicer; c, sub-let....6th bet Market and Walnut sts, br printing office; cost $6.000; o, Chronicle Printing Co; a. J. B. McElfatrick; c, L. N. Wickwire....2nd bet Monroe and Exchange sts, br car factory; cost $5,000; o, Brownell & Wight; a, Car Co; c, S. C. McCormack & Son....Dock bet Main and Hall sts, br planing mill; cost $5,000; o, J. Hafner; c. J. Hafner....2nd bet Carr and Cherry sts, br warehouse; cost $26,000; o, Mrs. R. Lewis; a, A. Grab; c, R. P. McClure.

WASHINGTON, D. C.—19th st bet N and O, two houses; cost $10,000; o a and b, Dearing & Johnson....N st, bet 19th and 20th, dwell; cost $5,000; o, Mrs. Dayton; a, Gray & Page; b, Joseph O'Hagan ...N st bet 17th and 18th, dwell; cost $17,000; o, A. Radford; o. Gray & Page; b, Jos. O'Hagan....H st bet 17th and 18th, dwell; $15,000; o, C. E. Hopkins; a, J. C. Hornblower; b, Dearing & Johnson....20th st, bet Hyllier av and 2d st, n w, br dwell, cost $18,000; o, Lieut. Mason, U. S. Navy; a, Gray & Page; b. Langdon & Gettinger....13th st, bet U and V, four houses; cost $8,000; o, T. S. Swormstedt; b, Mason....Massachusetts av, bet 21st and 22d, two houses, cost $10,000; o, Lawrence Sands.... P st, bet 6th and 7th, four houses, cost $8,000; o, W. Z. Partello ....Q st, bet 28th and 29th, two houses; cost $7,000; o, J. E. Nourse; b, Byran.

MISCELLANEOUS.

BOSTON, MASS.—No permits issued this week.

CENTRAL PARK VILLAGE, COOK CO., ILL.—Br chapel; cost $5,000; o, St. Barnabas Epis. Church; a, Treat & Folz,

CLINTON, IOWA.—No buildings at $5,000 reported this week.

HIGHLAND PARK, ILL.—Fr church; cost $7,000; a, Roman Catholic Church; a, Gregory Vigeant.

INDIANAPOLIS, IND.—Nothing new to report.

JEFFERSON ILL.—Br and st hotel; cost $12,000; o, David Jennings; a, Jno. P. Huber; b, Jno. Dumphy.

KANSAS CITY.—No. 1238 Broadway, br; cost $4,500. o, W. H. Lucas.

LAKE VIEW, ILL.—fr (Queen Anne) dwel; cost $6,000; o, M. Thome; a, J. W. Ackermann....Fr dwel; cost $8,000; o, Leopold Brauns; a, Cudell & Blumenthal; b, H. Blankenburg.

LOUISVILLE, KY.—No buildings at $5,000 reported.

SALT LAKE CITY.—Main nr 3d south, b hotel; cost $15,000; owner, Walker Bros.; a and b, Wm. Paul.

SOUTH CHICAGO, ILL.—Br and st plant for man'f R. R. cars, etc.; cost ab $500,000; o, U. S. Rolling Stock Co.; a, Thorne & Mowbray of Phil.; b, not decided. To be built early in the spring. Will cover 70 acres.

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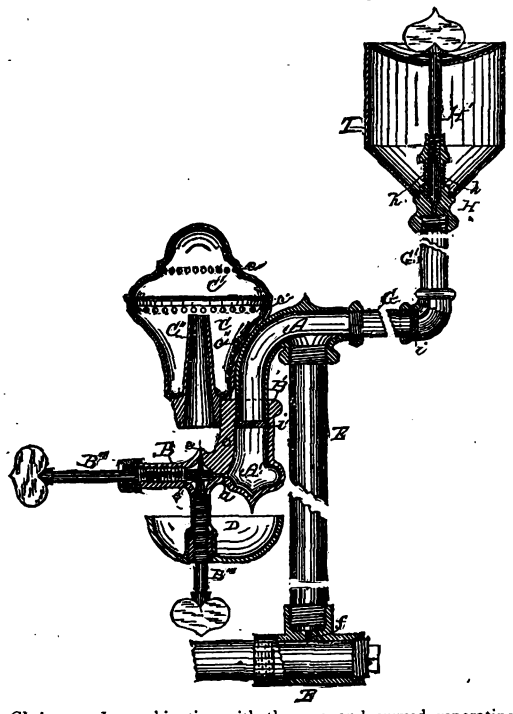
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

264,082. GASOLINE STOVE. PAUL HIEKISCH, Decatur, Ill. Filed Mar. 6, 1882. (No model.) Issued Sep'. 12. 1882.

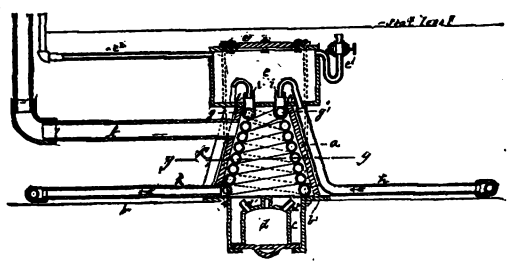


Claim.—1. In combination with the cup and curved generating-tube, the part B, constructed, substantially as shown, with a vertical tubular projection adapted to screw on to the lower end of the curved generator A, the gas chamber A[1], formed in its lower part with an orifice, *a*, controlled by the screw valve B[11], fitted into a laterally projecting stem and the disk *i*[1] forming one end of said gas chamber, substantially as herein shown and described.

2. In a gasoline stove, in combination with the part B and cup C, the curved generating tube A, provided with two inlet orifices, one at the end of the horizontally extended portion and one on the under side of the horizontally extended portion, as shown, the part B having two valves, constructed and arranged substantially in the manner shown, and for the purpose specified.

3. In combination with the tank I, supply pipe G[1], and valve, the main body of which unites the two—viz., the tank and supply pipe—the wire gauze filter *h h*, secured to the side of said valve and covering the orifice thereof, substantially as shown, and for the purpose specified.

264,116. HOT-WATER HEATING APPARATUS. HENRY SWINDELL, Allegheny, Pa. Filed Dec. 10, 1881. (No model.)

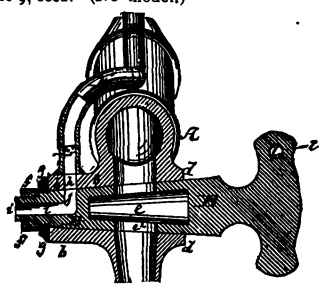


Claim.—1. A heater for railroad-cars, halls and other places, consisting of a coil or coils of pipe within a heating-cylinder, and connected with a water supply or head, and having a circulating pipe or pipes which return and discharge into the heating coil or coils, substantially as and for the purposes described.

2. A heater consisting of a conical heating-chamber, and two interlacing diagonally-coiled heating-pipes having circulating-pipes which extend from the lower ends of the coils and return and discharge into the upper ends, in combination with a water-supply tank, an annular opening between the tank and pipes, and a suitable lamp or other heating device, substantially as and for the purpose described.

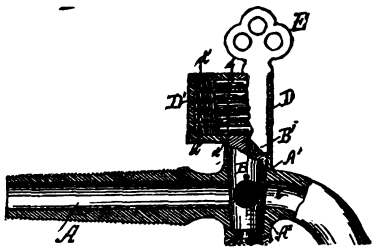
3. The combination of the heating coil or coils of a hot-water heating apparatus with the circulating pipe or pipes discharging thereinto, and a water-supply pipe or channel also discharging thereinto, substantially as and for the purpose described.

264,177. VENT-FAUCET. ADOLPH LUHRS, New York, N. Y. Filed June 9, 1882. (No model.)



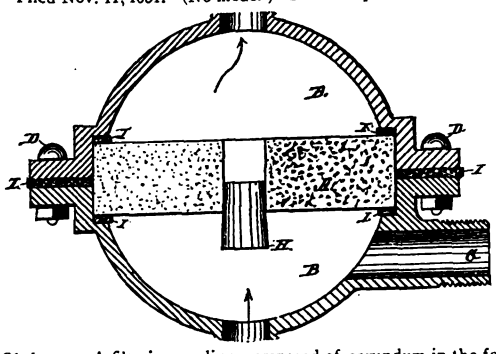
Claim.—In a vent-faucet, the spigot B, having in its smaller end the axial aperture *i*, and single angular branch aperture *j* on the latter, and having the indicating-mark *l*, in combination with the faucet-body A, tube E, and nut *f*, for operation substantially as described.

264,241. LOCK-FAUCET. WILLIAM S. CAMPBELL, New Orleans, La. Filed Mar. 18, 1882. (No model.)



Claim.—1. The combination of a faucet with rotary plug B, having a slot or recess, B,[2] in its end, a key, E, adapted to enter said recess and turn said plug, and pins *d* and springs *d*,[1] which serve as a lock, substantially as set forth.

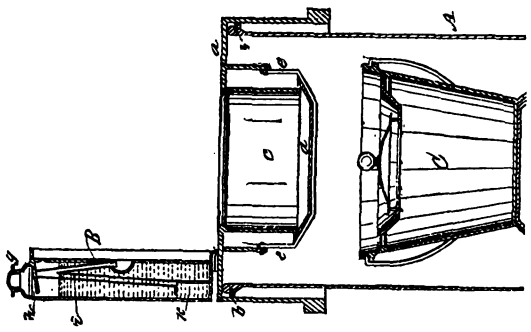
264,314. FILTER. WILLIAM MAYNARD, New York, N. Y. Filed Nov. 11, 1881. (No model.) Issued September 12, 1882.



Claim.—1. A filtering medium composed of corundum in the form of a porous conglomerate, as described.

2. The combination, with a filter case or chamber, of a rigid porous filtering medium having a hole through the same provided with an elastic medium substantially as and for the purpose described.

264,315. PORTABLE WATER CLOSET. JOHN MCAULIFFE, Portland, Conn., assignor to himself and John J. Barry, same place. Filed May 1, 1882. (No model.) Issued September 12, 1882.

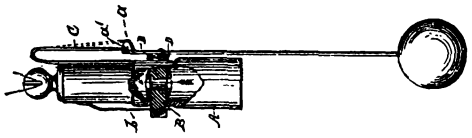


Claim.—1. The hollow cover B, constructed to discharge water when closed, in combination with the box A, seat *a*, bowl *c*, and pan *d*, substantially as described.

2. In portable closets or commodes, the cover B, provided with discharge-pipe *i*, partition *h*, and tray *k*, in combination with the seat *a* and box A, substantially as shown and described.

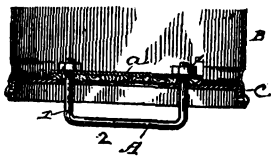
264,320. AUTOMATIC CUT-OFF FOR GAS BURNERS. GILL W. METCALFE, Baltimore, Md., assignor of one-half to S. Silberschmidt, same place. Filed June 17, 1882. (No model.) Issued September 12, 1882.

Brief.—Spring C is placed against *a*, and the gas lighted. C is expanded and slips by *a* and is caught by *a*[1], where it is held. If the flame be extinguished, C contracts and is thrown outward from the burner, and the weight E falls to turn off the gas.



Claim.—The combination, with the gas burner and the perforated gas-cock, of the bent bar C, having both legs on the same side of the burner, with its bent end uppermost, and one leg attached to the burner and the other free, and the elbow-lever, having one arm provided with lugs *a* and *a*[1] in different planes with respect to the end of the bar C, and the other arm provided with a weight, substantially as shown and for the purpose described.

264,342. VALVE FOR WELL BUCKETS. WILLIAM H. ROE, St. Joseph, Mo. Filed Mar. 10, 1882. (No model.) Issued September 12, 1882.

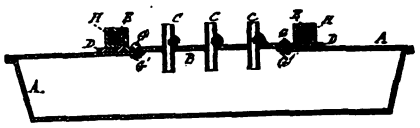


Claim.—In combination with a reversible well-bucket bottom and its valve, the valve-connection A, consisting of the central horizontal part, 2, the arms 1 1, the said central part being placed outside, and said arms being connected at their ends to the valve, substantially as described.

264,402. ABSORBENT CUSHION FOR HYDRO-CARBON-BURNERS. CHARLES F. BURLEIGH, Pawtucket, R. I. Filed July 15, 1882. (No model.) Issued September 12, 1882.

Claim.—1. In a hydro-carbon oil burner of the character herein specified, a cushion of cork secured to the burner-plate bearing the wick-tubes, substantially as and for the uses and purposes shown and described.

2. In a hydro-carbon-oil burner for stoves, a removable burner-plate wherein are located the wick-tubes, the edges of said plate being bent over and holding in place a cushion of cork, which presses against a collar upon the oil-pot, substantially as shown and described.

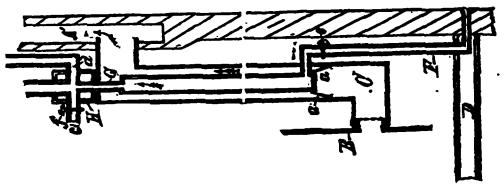


3. In a hydro-carbon-oil burning stove, a burner-plate wherein are located wick-tubes, the edges of said plate being bent over, as set forth, and holding in place an absorbent cushion, in combination with a collar affixed to or forming a part of the oil-pot, substantially as shown and described.

4. In a hydro-carbon-oil burner for stoves, a cushion of absorbent material located and held in place upon the oil-pot, as set forth, in combination with a burner-plate adapted and arranged to be secured in place thereon, substantially as shown and described.

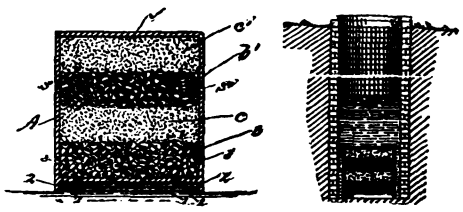
5. Oil-pot A, bearing-collar D, burner-plate B, having bent edges E, and cushion H, the whole combined and arranged to operate substantially as shown and described.

264,408. HEATING APPARATUS. EPHRAIM H. GRAVES, Morrison, Ill., assignor of one-half to O. F. Woodruff, same place. Filed Feb. 10, 1881. (No model.) Issued September 12, 1882.



Claim.—In combination with the discharge-pipe G and cross-pipes *e* and *d*,, the cylinder H, substantially as shown and for the purpose described.

264,463. FILTERING AND PURIFYING WATER IN WELLS, GEORGE KOEPPEL, Alma, Wis. Filed May 13, 1882. (No model.) Issued September 12, 1882.



Claim.—The described apparatus for purifying water in wells consisting of a box or case having a raised and perforated bottom and containing alternate deep layers of charcoal and sand, the charcoal being at the bottom and having side perforations located on a level with the charcoal only to permit the passage of water through the box directly to and from the charcoal only and thence to and through the sand.

264,050. APPARATUS FOR HEATING CARS. MAURICE J. WALSH, New York, N. Y., assignor by mesne assignments to Louis Fitzgerald, same place. Filed May 25, 1882. (No model.) Issued Sept. 5, 1882.

264,126. GAS-ENGINE. CHARLES GRANTLEY BEECHEY, Liverpool, England, assignor to William Thompson Mann, James Gregson Chapman, Alfred Chapman, Henry Shield, and Alexander Spiers, all of same place. Filed Dec. 29, 1881. (No model.) Patented in England July 6, 1881, No. 2,961; in France Dec. 22 1881, No. 134,503, and in Germany Dec. 24, 1881, No. 55,051.

264,154. OIL-STOVE. LOUIS C. HECKMAN, Cleveland, Ohio. Filed April 10, 1882. (No model.)

264,155. OIL-STOVE. LOUIS C. HECKMAN, Cleveland, Ohio. Filed Feb. 24, 1882. (No model.)

264,158. SMOKE AND GAS CONSUMING FURNACE. DE WITT C. HILL, Willimantic, Conn., assignor of two-thirds to John Scott, same place, and William E. Barrows, Hartford, Conn. Filed Aug. 25, 1881. (No model.)

264,227. DYNAMO-ELECTRIC MACHINE. GEORGE W. BEARDSLEE, Brooklyn, N. Y., assignor to William F. Jobbins, East Orange, N. J. Filed May 9, 1882. (No model.)

264,328. ELECTRIC LAMP. ALBANUS W. MORTON, Rahway, N. J. Filed Dec. 22, 1881. (No model.) Issued September 12, 1882.

264,338. PUMP-VALVE. CHARLES C. REDMOND, San Jose, Cal., assignor to Milton Campbell, same place. Filed May 8, 1882. (No model.) Issued September 12, 1882.

264,346. ELECTRIC LAMP. HERMANN SEDLACZEK and FRANZ WIKULILL, Leben, Austria, and Sigmund Schuckert, Nuremberg, Bavaria, Germany. Filed Jan. 19, 1882. (No model.) Patented in Germany, June 6, 1879, No. 8,580; in France June 11, 1879; No. 131,152; in Belgium June 12, 1879, No. 48,449, and Apr. 20, 1881, No. 54,26; in Austria-Hungary Aug. 6, 1879, No. 19,078, and Oct. 28, 1879, No. 29,952, and in England Apr. 12, 1881, No. 1,590. Issued September 12, 1882.

264,387. CHAIN PUMP. CHARLES WHIPPE, LEONARDSBURG, Ohio. Filed Apr. 17, 1882. (No model.) Issued September 12, 1882.

264,406. CARBURETING APPARATUS. AARON W. FRAIL, Ashland, Mass., assignor to himself and Albert Whiting Eames, same place. Filed Mar. 18, 1882. (No model.) Issued September 12, 1882.

264,517. INCANDESCENT ELECTRIC LAMP. WM. CROOKES, London, England. Filed August 1, 1882. (No model.) Patented in England Aug. 31, 1881, No. 3,799; in France September 30, 1881, No. 145,080, and in Italy May 26, 1882, No. 14,225. Issued September 19, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING DECEMBER 9, 1882

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland.....Maine	34,390	14	21.2	4	20.5			5																
Boston.....Mass	399,446	173	22.4	57	32 9	4		32	6	5	19		3		4	16		10		2	2			
Cambridge.....Mass	56,566	19	17.1	5	26.3			4			1					3		1						
Worcester.....Mass	63,776	24	19.2	9	37.5			3		1			2			3					4			
*New Haven.....Conn																								
Providence.....R. I	111,987	47	21 3	17	23.4	2	1	3	1		1		9		1	8		1						
Total	666,165	277	21.3	86	31.0	6	1	47	7	6	21		14		5	30		12		2	6			
EASTERN CITIES.																								
Albany.....New York	97,035	39	20 8	17	43.5	1		5	3		3		2				2	2		7				
New York.....New York	1,282,349	578	23.4	200	34.6	17	5	106	14	10	22	2	5	9	5	82		35		13	1		5	
Brooklyn.....New York	621,563	240	18.2	85	33.0	7		40	5	4	15		3	4	13	33	3	18			3		4	
*Hudson Co.....New Jersey																								
Newark.....New Jersey	145,701	64	22 3	29	45.3	1	5	7	1	5	2	1	1	1	2	2	2	2						
*Camden.....New Jersey																								
Philadelphia.....Pa.	896,157	405	23.4	128	31.6	7	1	55	16		41	1	12	2	9	46	7	4		1		4	2	
*Reading.....Pa.																								
Wilmington.....Delaware	46,087	16	17.7	7	43.7			2					3			1								
Total	3,088,892	1,342	22.4	466	34.7	33	11	215	39	19	83	4	26	16	29	164	14	61		21	4	4	11	
LAKE CITIES.																								
Buffalo.....New York																								
Rochester.....New York	91,616	36	20.3	5	13.8	1		6	1		5		2	2	2	1	1	1						
Syracuse.....New York	54,168	13	11.9	3	23.0	1		3		1				2			1	1						
Cleveland.....Ohio	186,277	68	18.7			1	1	3	3		12	1				6	2			1				
Detroit.....Michigan	128,431	49	19.7	16	34.4			3	1	1	6		3		6	2		2			2			
Chicago.....Illinois	580,625	187	16.6	84	44 9	4	1	14	7	6	13		8	2	7	4	3	4			2	1		
Milwaukee.....Wisconsin	131,661	50	19 6	29	58.0	1		4	2		4		1		1	5	1	2	1					
Total	1,172,778	403	17.7	137	33 9	8	2	33	14	8	40	1	14	6	16	18	8	10	1	1	4	1		
RIVER CITIES.																								
Allegheny.....Pa.	87,155	32	18 7	18	56.2		1	5	2	1	2		1		1		1							
Pittsburgh.....Pa	185,135	60	16.6	16	26.6	9	1	11	1		5		9			7	2			1		1		
Cincinnati.....Ohio	265,471	107	20.9	39	36.4	8		10		4	1	1	9	1	4	10	5	7			3		1	
Dayton.....Ohio	41,108	11	13.5	2	18.1			2					1											
Louisville.....Ky.	130,116	28	10.9	4	14 2	1		8	1				2	1		2						1	1	
Indianapolis.....Indiana	84,443	21	12.5	11	52 3	2		4		2		1	2		4	1	1	2						
Terre Haute.....Indiana	29,660	3	5.2	1	33.3																			
Minneapolis.....Minn	88,728	18	10.5	7	38.8	1		2	2		6				2	3								
St. Paul.....Minn	51,463	27	27.0	13	40.7	1	2	1	1	1	8					3								
St. Louis.....Mo	360,580	159	22.8	68	42.1	8	1	18	5	3	25	1	2	5	10	13		8			2		1	
Total	1,423,859	466	16.6	179	36.9	30	5	61	12	11	47	3	26	7	21	39	9	17		1	5	2	3	
PACIFIC CITIES.																								
*San Francisco.....Cal																								
Total																								
SOUTHERN CITIES.																								
District of Columbia..	Wh.	134,042	38	14.5	7	18.4	2		2			1		1	4	4	1	1			1			
"	Col.	69,663	23	17.1	10	43.4			8					1		3		2					1	
Richmond, Va.	Wh.	38,024	5	6.7					2															
"	Col.	29,110	14	25.0	7	50.0	1		2		1					2	1				1			
Charleston S. C.	Wh.	22,699	9	20 2	2	28.2			7				2			3		1						
"	Col.	27,537	24	44.7	9	37.5																	1	
Atlanta Ga.	Wh.	24,764	10	20.9	6	60.0			1		1		1			1								
"	Col.	18,695	6	16.6	2	33.3	1		2		1													
*Savannah Ga.	Wh.																							
"	Col.																							
Nashville Tenn.	Wh.	31,086	7	11.4	8	28 5				1	1			1		1						1		
"	Col.	18,848	10	27.6	2	28.0					1			1		1	1							
Memphis. Tenn	Wh.	18,677	11	31.2	3	27.2					3	1				2							1	
"	Col.	14,896	10	34.9	3	30.0	1		1		1			1										
*Mobile Ala.	Wh.																							
"	Col.																							
New Orleans La.	Wh.																							
" "	Col.																							
Total White		269,292	80	15.1	20	25.0	2		12	1	5	2		3	2	4	11	1	2		1	1	1	
Total Colored		178,749	87	25.5	33	37.9	3		13		4				3		6	2	2		1		2	
Total in 33 U. S. Cities		6,799,735	2,655	20.3	921	34.6	82	17	381	73	53	193	8	83	34	75	268	34	104	1	25	21	8	16
Nov. 25—Total in 28 English Cities		8,469,571	3,919	24.2			148				53	29		96		110					120		5	88
" " " 8 Scotch "		1,219,586	470	20.3			21				15	19		10		17					13			15

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Notes and Abstracts.

For the week ending December 9, of a total urban population of 6,799,735, there died 2,655, which corresponds to an annual death rate of 20.3 per 1,000, which is less than that for the preceding week in which it was 21.3. The rate was highest in New York city and Philadelphia, in both which cities it was 23.4. The folly of estimating the healthfulness of a city from the data of a single week is well illustrated in the above table, in which Louisville has a mortality corresponding to 10.9, and Terre Haute to only 5.2 annual rate per 1,000. In the table of last week the Louisville rate was 23.9, and the Terre Haute rate eight. The ratios in the above table, which are really valuable as indications of relative healthfulness for the week, are not those for single cities, but for the several groups of cities. For a single city the death rate for the week should be compared with that of three or four preceding weeks to get a fair average.

The fact that the mortality rate for the River cities for the week is only 16.6, while that of the Eastern cities is 22.4 is really significant. Diphtheria is increasing in the River cities, but the large number this week is largely due to the appearance of St. Louis for the first time in this table. Deaths from small-pox are reported during the week from Philadelphia four, Chicago one, Pittsburgh one, Louisville one and Nashville one.

The low death rate among the white inhabitants of Southern cities is due to the almost complete absence of diphtheria and scarlet fever, and the comparatively small amount of acute lung disease. The zymotic disease which is at the present time most threatening in the United States is diphtheria.

NEW YORK CITY.—Dr. B. H McCann, examining physician for the Board of Commissioners of Public Charities and Corrections, shows that during the month of November, 1,879 applicants for medical relief were examined, of which number 1,839 were admitted to hospital. The figures for the preceding month were 1,477 applications and 1,455 admissions, the increase being the usual one on the advent of cold weather.

Of the cases admitted to hospital in November, 145 were general diseases, 54 fevers, 298 diseases of the respiratory organs, 444 were surgical cases and injuries, and 198 cases of alcoholism. Bellevue Hospital received 879. Charity Hospital 504, and the Homœopathic Hospital 379. 1,149 were male and 687 female adults. One male and two female children.

PITTSBURGH, PA.—Dr. Wm. Snively reports eight cases of small-pox.

SANDWICH, ILL.—Dr. Ballou reports the continued prevalence of the epidemic of measles.

LOUISVILLE, KY.—Dr. E. R. Montgomery, health officer, reports the occurrence of 12 cases of small-pox during the week.

BOSTON, MASS.—C. E. Davis, Jr., reports 58 cases of diphtheria, 25 of scarlet fever and 12 of typhoid.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports 13 cases admitted, three discharged and three dead, leaving 1,350 under treatment.

PROVIDENCE, R. I.—Dr. E. M. Snow reports the epidemic of typhoid as decreasing rapidly; only five cases that commenced in the month of December were reported during the week. There is still a large number of persons suffering from the disease. With the exception of typhoid fever the health of the city is as good as the average for the

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season. Of the 47 decedents reported during the week 11 were under five years of age and the same number were sixty years and over that age.

BALTIMORE.—The total number of deaths reported in Baltimore for the week ending Dec. 9 was 178, of which 67 were under five years of age, and 34 were people of color. According to the estimate of the population based on the United States census this gives a mortality equal to an annual rate of 26 per 1,000. According to the estimate of population made by the Registrar it is 22 63 per 1,000. Diphtheria and small-pox continue prevalent, there having been 20 deaths from the former and 23 from the latter. Twenty-four deaths are reported from consumption, 2 from measles, 4 from scarlet fever, 2 from typhoid fever and 4 from croup.

RAVENNA, PORTAGE CO., O.—The postmaster reports a fatal case of small-pox. No new cases have as yet developed.

DETROIT, MICH.—Dr. O. W. Wight reports 41 cases of scarlet fever and 12 cases of diphtheria during the week.

MICHIGAN.—Dr. H. B. Baker, Secretary State Board of Health, in his bulletin for the week ending Dec. 2, reports the following diseases in their order of greatest area of prevalence; neuralgia, bronchitis, rheumatism, consumption, intermittent fever, tonsillitis, remittent fever and influenza. Neuralgia has greatly increased in area. Cholera morbus, diphtheria, erysipelas and whooping cough have increased, while intermittent and typho-malarial fevers have decreased.

NEW ORLEANS, LA.—The report for the week ending Dec. 2 was received too late to be embraced in our table of last issue. The deaths numbered 136—85 of the decedents being white and 51 colored, giving an annual rate for the white population of 27.31 and for the colored a rate of 44.77. Small-pox caused nine deaths, measles one, scarlet fever one, cerebro-spinal fever one, typhoid fever two, malarial fevers nine, diphtheria one, consumption 22, pneumonia five, diarrhœa and dysentery 12 and accidents, three deaths.

PORT OF NEW YORK.—Immigrant Inspection Service.—During the week ending Dec. 2 there arrived 4,848 immigrants, of whom 67 were vaccinated at the quarantine station. Dr. Wm. M. Smith, Health Officer of the port, in transmitting the report of the quarantine inspector, says "The Surgeon of the *Gellert* certified to having found 348 sufficiently protected by vaccination and vaccinating 600. The vaccinations were not made until four days before entering this port, consequently the results of his vaccination could not be satisfactorily determined, nor could it have protected the emigrants from any contagion of small-pox, if any had been received before embarkation. There were five cases of diphtheria, 12 of measles, one of pneumonia, and several of capillary bronchitis among the emigrant passengers. The cases of diphtheria and measles were promiscuously mixed in rooms opening into the narrow gangway connecting the forward steerage and the second cabin saloon, and along which the steerage passengers were constantly passing. Each hospital room was occupied by five or six patients, and several attendants or friends. The portlights were closed, so that little or no ventilation was secured except as it came through the doors which opened into the gangway. When closed the atmosphere of the hospitals soon became offensive and injurious to the occupants, and when opened the contaminated hospital air was inhaled by the passengers passing along the gangways, and by those occupying the forward steerage. In two rooms opposite to the hospitals of the sick, separated by the gangway referred to, were five "lying-in" women. Three deaths were reported to have occurred on the passage, and several more are said to have occurred before the sick reached the emigrant hospital on the day following their arrival."

DETROIT, MICH.—Immigrant Inspection Service. The report of Dr. Mulheron for the week ending Dec. 2, shows the arrival of 331 immigrants, of whom 27 required vaccination.

PORT HURON, MICH.—Immigrant Inspection Service.—The report of Dr. H. R. Mills, for the week ending Dec. 2, shows the arrival of 549 immigrants, of whom 461 were Canadians and 88 Europeans by way of Halifax, New York and Portland. Three hundred and fifty-six of these required vaccination, which was performed by the inspectors.

HORNELLSVILLE, N. Y.—Dr. Elisha Harris, Secretary State Board of Health, in a paper on the movement of infectious diseases, records a case of small-pox taken from the cars by the State Inspector at this station on Nov. 9. The case was *en route* from Cincinnati. One of the railroad employés who was exposed to the infection took sick two weeks afterward and died of the disease. He had been vaccinated 19 years before, and had two well marked vaccine scars on his arm. Vaccination protected all other persons exposed to infection from these two cases.

In a second paper Dr. Harris records the occurrence of a death from diphtheria on the cars of the N. Y. Central R. R., in the family of an immigrant arrival by the S. S. *Gellert* (see item Port of New York). Dr. Harris refers to plans which, when perfected, will secure the separation and isolation of cases of infectious disease among immigrants by the coöperation of the Commissioners of Emigration and the Health Officer of the Port with the State Board of Health.

ENGLAND.—The returns of the Registrar-General for the week ending November 25, shows an average mortality rate of 24.2 per 1,000 in the 28 principal towns. The highest ratio was registered in Sunderland, 47.8; the lowest in Bolton 14.7. The rate in London was 22.5. The 29 deaths from diphtheria in the 28 towns included 16 in London, four in Liverpool, three in Sunderland, two in Birmingham, and two in Sheffield. Small-pox caused two deaths in London, two in Manchester, and one in Newcastle-upon-Tyne.

SCOTLAND.—Consul J. A. Leonard transmits the return of the Registrar-General for the week ending November 25. The lowest mortality was recorded in Perth, viz.: 17.2, and the highest in Glasgow. The average rate is given in our statistical table. Diphtheria, including croup and laryngitis, caused 20 deaths, 13 of which were registered in Glasgow. Dundee and Glasgow are the only towns in which measles figure as a cause of death.

PARIS, FRANCE.—The Bulletin for the week ending November 16 shows a total of 1,002 deaths, 256 being under five years. Annual ratio 23.29. Typhoid and typhus fevers caused 120 deaths, small-pox six, measles 11, scarlet fever one, whooping-cough five, diphtheria 27, consumption 175, and pneumonia 65 deaths.

LYONS, FRANCE.—Consul Ben. F. Peixotta reports 158 deaths during the week ending November 11, as against 137 during the previous week; chronic diseases caused the increase, there being no diseases epidemic.

RHEIMS, FRANCE.—Consul John L. Frisbie reports 54 deaths during the week ending November 19; of these seven were caused by cerebro-spinal meningitis, four by diphtheria, and two by measles. "As to cleanliness," says Dr. Frisbie, "the city is kept in the best possible condition, the authorities paying strict attention to such matters."

ROTTERDAM, NETHERLANDS.—Consul John F. Winter reports 10 cases of small-pox during the week ending November 25, but no deaths from the disease. His report states measles to be the prevailing disease.

ROME, ITALY.—Deputy Consul-General Chas. M. Wood reports for the week ending October 29, a mortality of 106, 13 of which were caused by consumption, five by bronchitis, seven by pneumonia, four by malarial fever, and two by dysentery. Mr. Wood states for the information of our people who may contemplate visiting Rome during the coming season that the city is in excellent sanitary condition and that the public health is in every respect most satisfactory.

VIENNA, AUSTRIA.—Consul-General Jas. R. Weaver's report for the week ending November 18 shows 333 deaths, equivalent to an annual rate of 23.4. The deaths under five years numbered 128. Consumption caused 80 deaths, lung diseases 49, scarlet fever six, diphtheria three, whooping-cough six and typhoid fever two deaths.

WARSAW, RUSSIAN POLAND.—Consul Rawicz reports nine deaths from small-pox during the week ending November 11.

BRUSSELS, BELGIUM.—During the week ending October 18 there were 161 deaths, of which four were from typhoid, three from croup, one from whooping-cough, three from puerperal diseases, 25 from bronchitis and pneumonia, and 19 from consumption.

BERLIN, GERMANY.—Consul-General M. S. Brewer reports a death rate of 23.2 during the week ending November 4. Diphtheria and scarlet fever are recorded as prevalent.

ONTARIO, CANADA.—The Health Bulletin of the Province for the week ending December 2, shows the following diseases in the order of area of prevalence: bronchitis, neuralgia, anæmia, influenza, diphtheria and consumption.

CARDENAS, CUBA.—Jas. H. Washington, Vice-Consular Agent, reports the city as perfectly healthy and free from yellow fever.

HAVANA, CUBA.—Dr. D. M. Burgess reports 526 deaths during the month of November, 41 of which were caused by yellow fever, 11 by typhoid fever, five by intermittent and seven by pernicious fever, one by small-pox, one by diphtheria and two by croup. Of the deaths from yellow fever, 11 occurred among civilians and the others (30) in the military hospital. Weather cool and northerly winds prevailing.

GEORGETOWN, DEMERARA.—Vice-Consul J. H. de Jonge reports 162 deaths during October, in a population of 47.175. Croup caused two death, fevers 11, diarrhœa nine, thrush 15, and consumption 25.

RIO DE JANEIRO, BRAZIL.—Deputy Consul-General Jas. H. Murray sends reports for the weeks ending November 4 and 11. Small-pox is the prominent disease on the record of mortality, 75 deaths having been caused by it during the two weeks. The small-pox hospital (Nossa Senhora da Sande) not being able to accommodate the increasing number of patients, the authorities have concluded to establish another on the island of Santa Barbara.

DESTERRO, SANTA CATHARINA, BRAZIL.—The subsidence of the small-pox epidemic is shown by the reports of M. W. Comsett, Consular Agent, for the weeks ending October 9 and 16. Four deaths from the disease are recorded in the former and but one in the latter.

CHOLERA AT MECCA.—Consul General G. H. Heap, Constantinople sends copies of telegrams and reports showing the disappearance of cholera at Mecca. The disease began Oct. 24 and increased until the 31st, after which the deaths diminished in number daily, until Nov. 10, when none were reported. Meanwhile the pilgrims have all departed from Mecca.

FOOCHOW, CHINA.—For the week ending Oct. 28 Vice Consul J. P. Cowles reports no mortality in the foreign community. A summary is given for the year ending Sept. 30 of the work of the hospital and dispensaries for women and children of the Woman's Foreign Missionary Society of the American Methodist Episcopal Church. Physicians: Miss Sigourney Trask, M.D., of Pennsylvania and New York, and Miss Julia E. Sparr, of Indiana and Ann Arbor, Mich. Patients, 2,495; prescriptions, 4,970; surgical operations, 264; visits to out-patients, 1,269; deaths in hospital, one. A new dispensary has been established in the centre of the native city, Miss Sparr in charge. Efforts are being made to add a hospital there—the Governor-General and Chinese officials have subscribed $500 and Chinese merchants $300. The energy of these ladies is to be commended.

SHANGHAI, CHINA.—F. D. Cheshire, Vice Consul-General, sends reports for the three weeks ending Oct. 24, and 31, and Nov. 7. He remarks that a few cases of dysentery have again appeared with a return of mild weather. Cases of malarial fever are less frequent. Cholera is behaving as it does here year after year, sporadic cases cropping up from July to November, and chiefly among seamen.

SWATOW, CHINA.—C. C. Williams, Consular Agent, reports a fatal case of cholera as having occurred during the week ending Oct. 28. Malarial fevers are prevalent. Among the natives eye diseases and leprosy are of frequent occurrence.

MADRAS, BRITISH INDIA.—Consular-Agent Lumisden Strange reports for the week ending Nov. 3 a total of 255 deaths, equivalent to an annual rate of 33.3 per 1,000. Of this number 203 were buried and 52 were burned. Small-pox caused five deaths, measles three, fevers 58, diarrhœa and dysentery 30, and cholera none.

CALCUTTA, BRITISH INDIA.—Consul-General Mattson sends reports for the weeks ending October 14, 21 and 28. The deaths were respectively 253, 284 and 279; giving the annual rates of 30.4, 34.2 and 33.6 per 1,000. The deaths from cholera were nine, 20 and 32. The first of these records is said to be favorable, and the second and third re characterized as being considerably above the average.

In view of the increase of diphtheria in Philadelphia, the attention of school teachers and others is called to the rules of the Board of Health for preventing the spread of the disease, particularly among children.

REPORT ON SMALL-POX IN CALIFORNIA, 1880 AND 1881. By F. W. Hatch, M. D., 16 pp. 8 vo.

This is an extract from the report of the Secretary of the State Board of Health, giving a brief history of the progress of the disease in the State and an account of the quarantine established against it in the fall of 1881. Fifty-one deaths were reported in the State during 1880 as due to small-pox, all cases in the interior of the State having been due to communication with San Francisco. In 1881 seventy-five deaths from small-pox were reported. In September and October the disease was introduced into California by emigrants coming via Chicago.

In November a regular inspection service with vaccination of unprotected passengers was established on the border of the State at Truckee, on the Central Pacific Railroad, and by this some cases of small-pox were intercepted in January of this year. While as a rule inland quarantine against small-pox is not justifiable, since the results do not warrant the expense and trouble, yet in the case of emigrant trains there can be no doubt that these inspections, and the systematic vaccination carried out by their means, have accomplished much good.

CONJOINT SESSION OF NORTH CAROLINA BOARD OF HEALTH and Medical Society of North Carolina, held in Concord, May 10th, 1882. LXVI. Pp. 8vo.

This pamphlet contains an essay on preventive medicine by Dr. W. P. Beall, in which he urges upon physicians the importance of keeping records of disease, and a report by Dr. T. P. Wood, the Secretary of the State Board of Health, of its operations during the preceding year.

This report is made to the State Medical Society, which is, theoretically, the State Board of Health. As the law provides no means, what is done is practically a voluntary contribution on the part of the Secretary, Dr. Wood. The following account is given of the water supply of Wilmington:—

After analyses had shown that the water of the wells was unfit for use, in 1881 a company was organized to supply the city with water, and work was commenced in laying pipes without any announcement as to the source of the supply to be selected. The determination of the source of water was finally submitted to the County Board of Health, which had analyses of the water from the North-east branch of the Cape Fear River made by Prof. Nichols, of Boston, and Drs. Sedaux and Dabney of the Agricultural Experiment Station. Subsequently, during the long continued drought of 1881, analyses were made by Dr. Dabney, showing an undue proportion of chlorine and albuminoid ammonia and an odor of sulphureted hydrogen.

The Board found that the water had produced bad effects upon the mill hands and others at one time, and that in many seasons the water was brackish, and that there was a risk of contamination by sewage, and as the result it declared, "That in the opinion of this Board the water from the North-east branch of the Cape Fear River, as at present tendered to the city by the Clarendon Water Works Company, is not suited or fit for domestic use, according to the evidence presented."

The action of the Board was reported to the Board of Aldermen, but the water was formally received by them from the Company, the opinion of the Board being entirely ignored. Upon this the Secretary remarks "that the financial interests involved so frequently outweighs every other consideration, that it is discouraging to undertake such responsible business as advising public officers in matters appertaining to the public health. It is too often the case that they seek for advice hoping that it will coincide with the schemes they have on hand, deeming it entirely proper to accept or reject it, as suits their convenience."

There will no doubt come a time when the use of this water will produce sickness and death in Wilmington. Then let the citizens bear in mind the names of the members of the Board of Aldermen who have voted to accept this supply in open defiance of the advice of the very authority to which they had referred the matter for decision.

The water department of Harrisburgh, Pa., is waking up to the fact that the officials have some rights which citizens are bound to respect, and have procured from the Common Council a favorable report on the passage of an ordinance, giving the department exclusive control over service pipes and connections with the mains, and forbidding anybody but the "city tapper" to tap the mains.

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(Continued from page 59.)

NEW YORK.—The following bids for building about 40 lineal feet of crib bulkhead and platform south of pier at foot 79th street, East River, and for repairing existing bulkheads and platform from 78th to 79th streets, East River, were opened on the 18th inst., at the Department of Docks:

	DREDGING, per cu. yd.	CRIB AND REPAIRING.
John Gillies	$0.95	$7,797.00
Joseph Walsh	5.00	7,200.00
James D. Leary	.82	7,997.00

The work will be awarded to John Gillies.

PHILADELPHIA, PA.—The following bids were opened at the Treasury Department, Dec. 2, for plate, double-thick sheet and double-thick ground glass for the Court House and Post Office:

Bidders.	*American.*	*Foreign. Excluding Import Duty.*	*Foreign. Including Import Duty.*	*Time of Delivery.*
E. A. Boyd & Son	.....	4,181.00	6,700.03	6 weeks.
Heroy & Marriner	.....	4,794.00	7,804.00	4 "
London & Manchester	.....	4,690.00	7,744.00	3 "
Benj. H. Shoemaker	.....	6,942.88	9,014.33	2 "
John Lucas & Co	7,556.85	.....	.....	5 "
W. C. D. Pauw	6,995.00	.....	.....	3 "
Wm. Glenny & Co	7,800.00	.....	.....	6 "

E. A. Boyd & Son has been awarded the contract at $4,181.00 for foreign, excluding duty.

ALBANY, N. Y.—The following bids were opened at the Treasury Department, Dec. 7, for joiners' work and wood flooring for the Court House, etc., Albany, N. Y.:

Bidders.	*Joiners' Work.*	*Wood Flooring.*	*Total.*
Thomas Stephens	$24,500.00	$3,400.00	$27,900.00
Norcross Bros	36,000.00	4,200.00	40,200.00

Thomas Stephens' bid has been accepted.

AUGUSTA, GA.—The following bids for improving the Savannah river above Augusta, Ga., were opened at Gen. Gilmore's office, U. S. Army Building, this city, on Dec. 9. For excavating rock: Wm. H. Brown of Brooklyn, N. Y., $4.32 per cubic yard; Frank Blaisdell of Augusta, Ga., $4.50. For excavating gravel; Brown, $0.31 per cubic yard; Blaisdell, $0.35. For furnishing and putting in mattresses; Brown, $0.92½ per square yard; Blaisdell, $0.85. For furnishing and putting in loose stone: Brown, $2.31½ per cubic yard; Blaisdell, $2.75.

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Affidavit to the above effect in New York Papers of November 18th, 1878.

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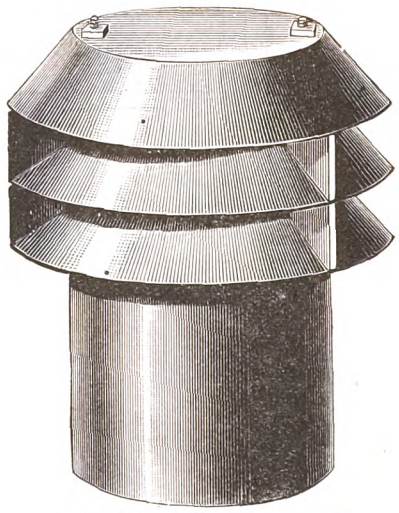

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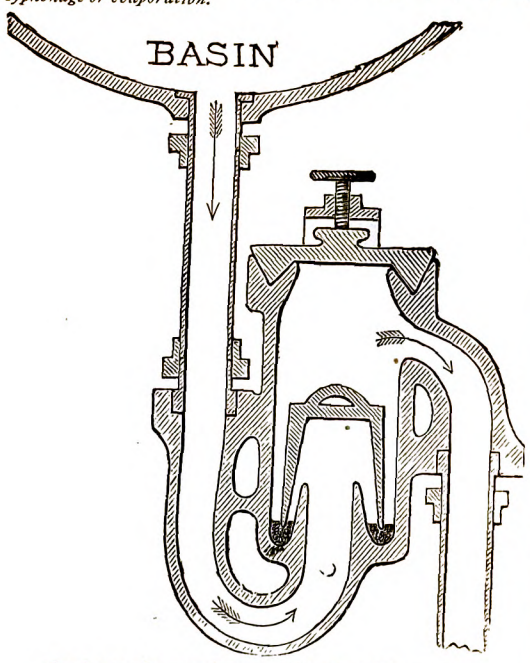
"*The mercury seal very effectually prevents the entrance of sewer air, even if the water in the cylinder should be removed by syphonage or evaporation.*



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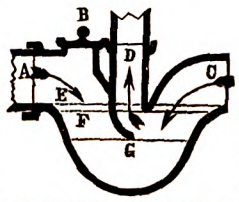

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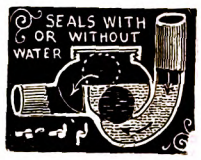

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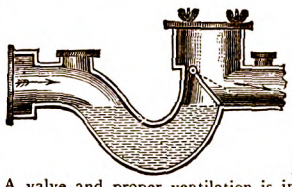

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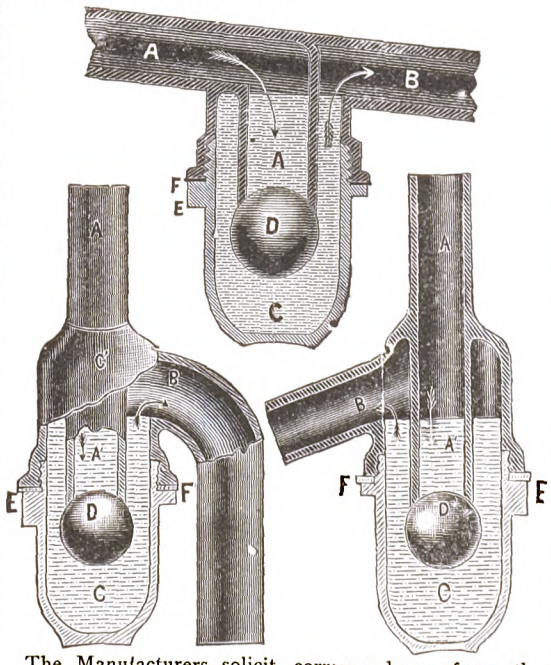

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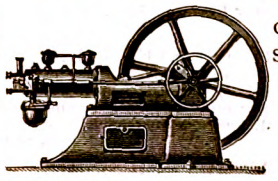

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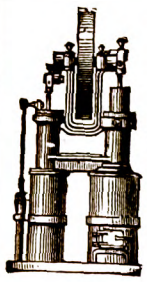

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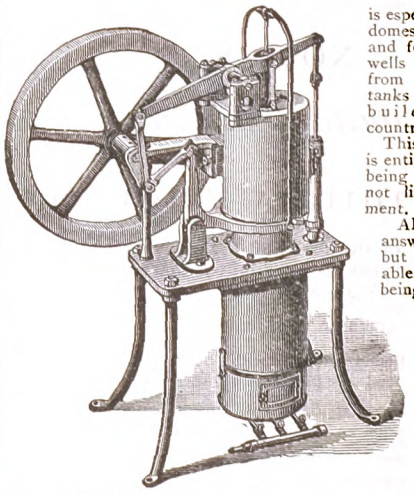

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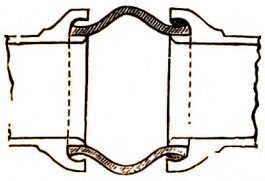

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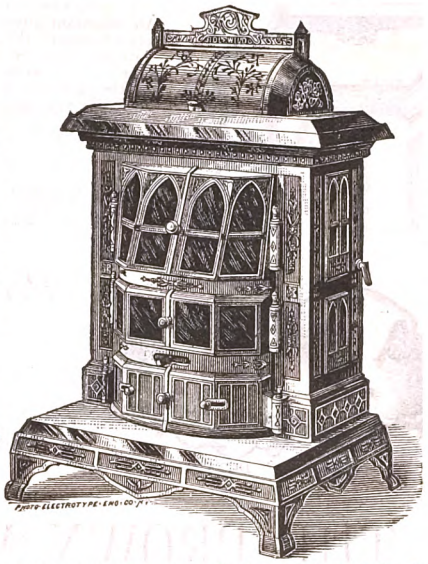

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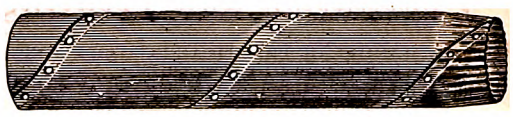

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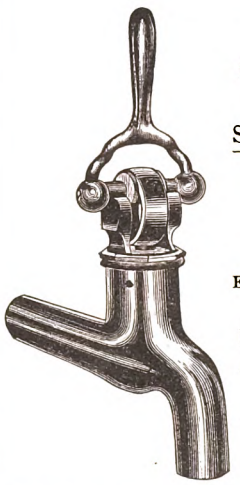

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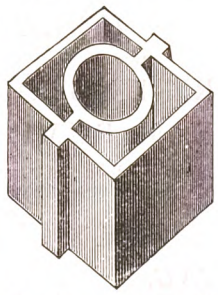

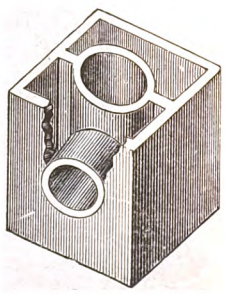

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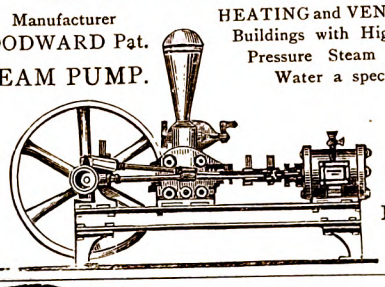

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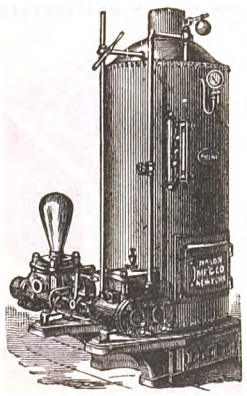

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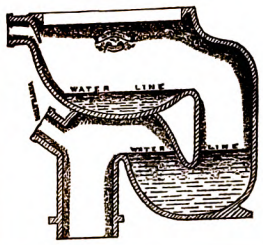

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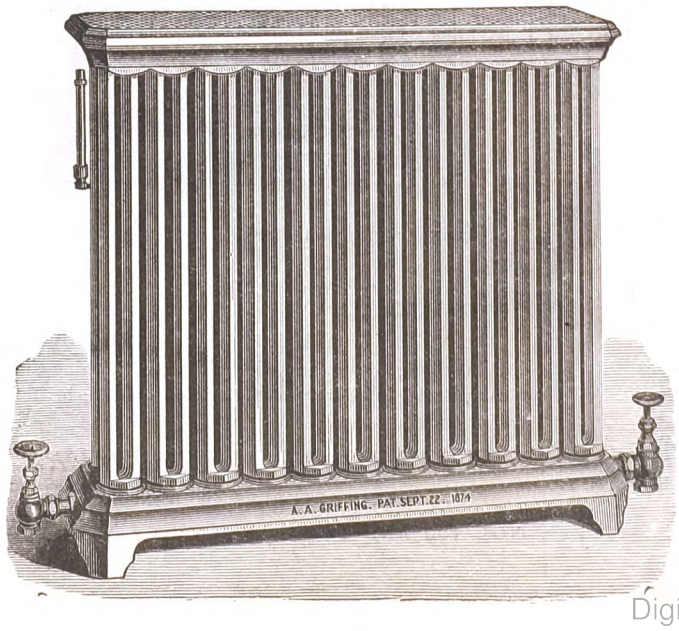

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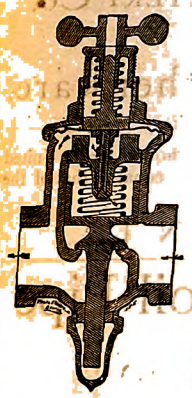

CURTIS PRESSURE REGULATOR.
Is made entirely of metal; occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for Circular.
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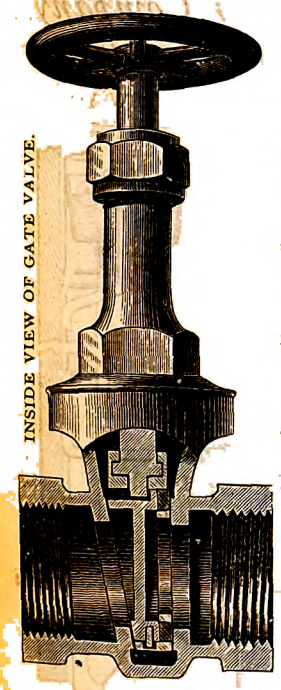

The advantages these valves possess over all other gate valves, are—

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2d. As the disc of packing wears, the inclined follower (or metal seat,) keeps the disc to its seat, making a perfect joint.

3d. Should the discs give out at any time, they can be replaced very quickly, and at a small cost.

4th. They do not have to be taken from their places to be repaired.

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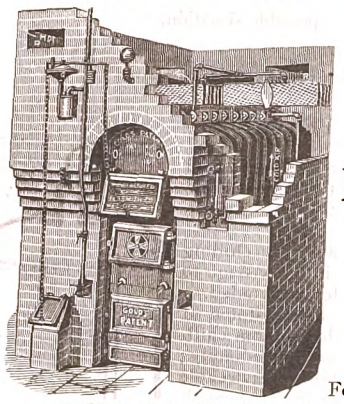

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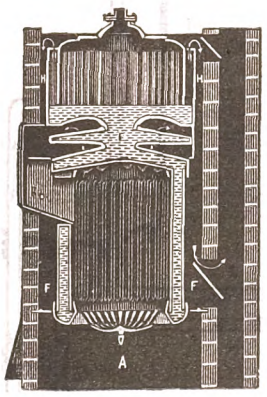

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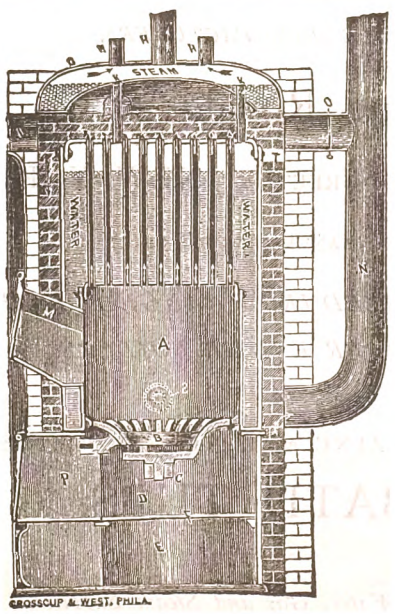

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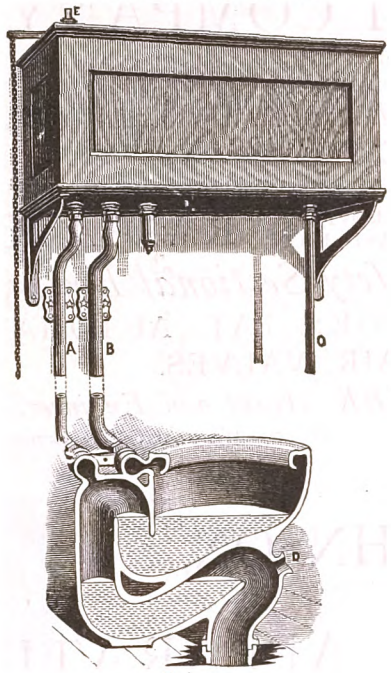

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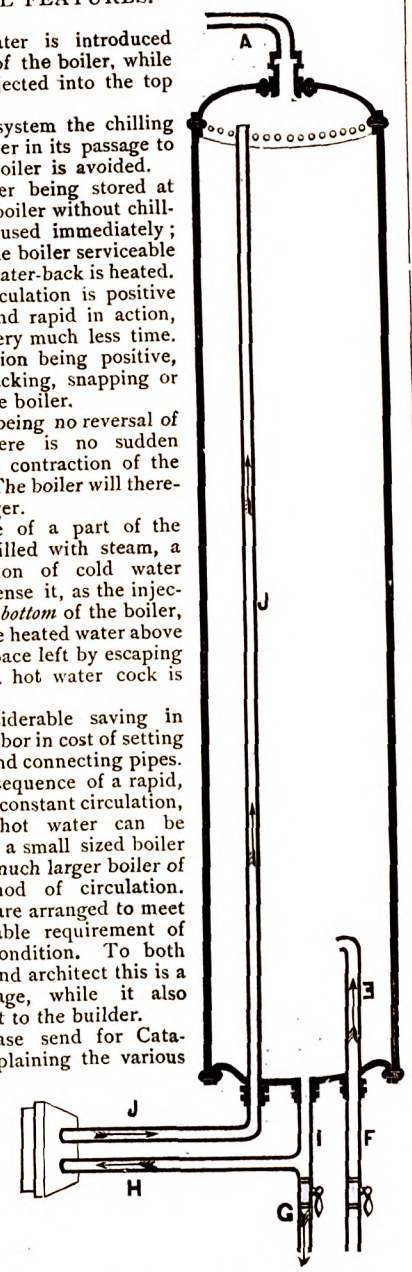

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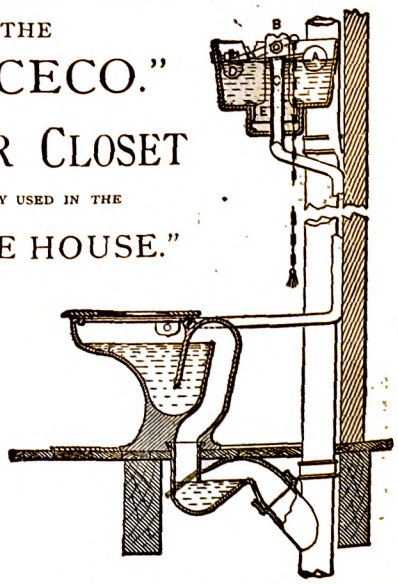

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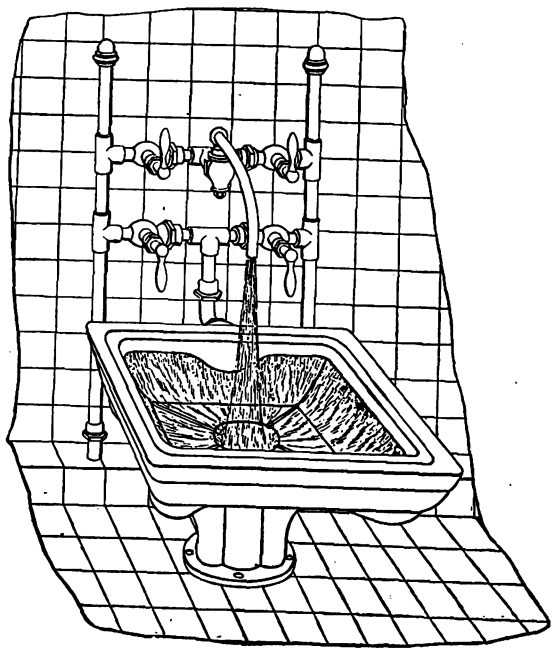

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THE WATER SUPPLY OF AMERICAN CITIES.

The question of supply of water to our large cities, including their suburban towns, is becoming more and more serious every day. The cities themselves are but the nuclei, the business centres of great masses of people whose daily avocations require their presence in the immense hives of buildings which are congregated in a small compass, but whose families live, and they themselves sleep, miles away in every direction to which means of rapid and frequent transportation are afforded them. The tastes and customs gratified in their luxurious business offices and in the dwellings in the fashionable quarters, are carried to remoter residences, and among these a lavish use of water is the most common and the one whose absence is most severely felt.

Most people cannot be made to understand that water in the house to be used at will is in reality an expensive luxury, and not only so, but that it is a difficult one to provide on a large scale. To supply the population which transacts its business in New York city, about two milion people, the entire available rainfall on at least two hundred square miles of territory would have to be stored and dealt out piecemeal, so to speak. That is to say, two hundred square miles of land must be kept free from polluting occupancy, large and expensive storage basins constructed on it and watched and tended with scrupulous and intelligent care, that the dwellers in the metropolis may have barely enough water for their needs. Practically more territory than this is required, for it is hardly possible to either so rigorously utilize the rainfall, or so rigidly enforce moderation in consumption. We will revert to this subject again very soon, and more in detail than we can at this time. The question is almost appalling in its magnitude and in the seriousness of the considerations of the comfort and even the existence of the dwellers in great cities, which are involved in the procuring of a sufficient supply of water for their use. New York, Philadelphia, and Boston are now seriously incommoded for water. Some of their suburban towns have outgrown the supplies which not long since they had procured and which were thought to be ample for many years to come. As the extension of the central city includes the suburbs and they are annexed one by one and form one community, the problem becomes more and more complicated and its solution difficult, under existing modes of administration where political services rather than professional knowledge and skill are made the requisites for office holding. If there is any one branch of municipal government in which a reform of method of appointment and tenure of office is needed more than in others, it is what may be termed the scientific branch, and particularly the hydraulic division of that branch. No engineering works can be safely or economically entrusted, whether as regards their design, their approval, their construction or their management to elective bodies or bodies appointed only for services to a political party.

Of the three great cities we have named, Philadelphia easily bears off the palm for inefficiency of organization. New York is next, and Boston, though in better condition, is still in bad plight. It is greatly to the credit of the present executive of the Philadelphia water works that under adverse circumstances, and hampered and obstructed by a Board of Aldermen who cannot be made to see the necessity of providing in advance for emergencies, he has been able to increase the efficiency and reduce the relative expenditure of operating the collection of odd machinery under his control. His reward is a caucus resolution to supplant him. Of New York we shall take occasion to speak at another time. In Boston the efforts of the water board to postpone the time of actual suffering for water, by the adoption of methods of repressing waste which have stood the test of experience, have been unsuccessful owing to the stupidity or something else of the aldermen. The "government of the people, by the people, for the people," is pretty in theory, but bad in practice as far as it is attempted to let miscellaneously elected aldermen order or forbid the expenditure of funds regardless of the experience of skilled men. A well defined plan of operations prepared by men who have made the procuring of water works' knowledge a special branch of their business, and a strict adherence to that plan, is the only basis for a well regulated management of the daily routine and the needed extension of works for water supply anywhere.

FOOD AND DRUG STANDARDS.

We print in another column an interesting and suggestive letter from Mr. Henry B. Parsons, in which he urges the importance of an early publication of standards and methods employed by the analysts of the State Board of Health in carrying out their work under the food and drug law of this State.

For the majority of drugs and officinal preparations, such standards and methods are already fixed by the Pharmacopœia, and for many other preparations the standard is simply what they claim to contain. In these last, however, and in most articles of food, variability must be allowed within certain limits, and these limits should be well known to the public. The fixing of these standards and the selection of the best methods of analysis requires much highly skilled labor, and is, therefore, expensive. At present this cost must be incurred by each State, unless it chooses to wait for and accept blindly the results obtained and published by some other

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State, and it is for this reason that it appears to us so highly desirable that there should be a national food and drug adulteration law, and that the General Government should assume the responsibility and cost of fixing standards and methods for all the States.

If the United States selects proper men to prepare these standards, and it is not difficult to provide the means of doing this so as to avoid the influence of politics, there is little doubt that the results of these works would meet with general acceptance, and that the uniformity so essential to the interests of the manufacturer, would thus be secured.

The information that the Board of Health of this city are beginning vigorous measures against violators of the plumbing law raises the question whether the time has not now come for the Master Plumbers' Association to act on Prof. Chandler's suggestion and determine what shall constitute membership in full and regular standing in the association. The question to be met is simply this, whether in view of the unpleasant notority these prosecutions will give the craft, unless its position toward skin work is unmistakably declared, the interests of the Association do not require them to draw up a code which will exclude flagrant violators of the law from membership. Sooner or later the question will have to be met by plumbers, just as it has had to be met by doctors and lawyers. Self protection will require it of them, and this is a good time to begin. How the Association should proceed we will not, at this time, undertake to say. But it occurs to us that as a starting point a standing committee on conditions of membership, composed of the most reliable members of the association should be appointed to investigate what the qualifications of membership should be, and what the delinquencies which shall be followed by expulsion from the association. Such a committee should report within a reasonable time and thus bring the whole matter in a compact shape before the Association, which would then have something definite before it to act on.

We do not expect that a reform of this kind can come in a day, or without opposition from certain members, but something of the kind will have to come. The trade of a plumber is every day seen to be closely like that of a pharmacist or even a physician in its intimate connection with the public health. A plumber can no more be permitted to work just as he chooses without regard to sanitary principles, than a pharmacist to blunder in putting up prescriptions, or a doctor to practice without knowledge of medicine.

All that need be said in conclusion is that the very demand for this plumbers' "code of ethics" is going to raise the standard of the trade by elevating it to the grade of a public business or profession, conducted with some regard to the public interest and the reputation of those who follow it as a calling.

The first serious blow-out in the steam pipes in the streets of this city, happened on Tuesday afternoon of last week at the corner of Nassau and John streets. The break was in the American Heating and Power Co. apparatus, and was not caused by an excessive pressure, as many seem to think; the pipe used being standard and normal and capable of withstanding a very much higher pressure than the supplying boilers would be subjected to.

The part which gave out was a corner which had been giving some trouble for a few days, and was previously *soft-p tched*—that is to say, had a clamp put on it filled with some loose material which could be pressed in—to stop a leak, caused, perhaps, by a defective fitting, but which we assume was the result of uncompensated expansion of the metal of the pipes where they formed a bow to get over some obstruction to their direct course.

A blow-out of this kind must be dangerous to those who are very close to it, and must cause inconvenience to the public and consumers, but never can be attended with results similar to a boiler explosion, nor can the streets be ripped up for any length, the break being confined to the fitting, or thread on the pipe, and never splitting a pipe its whole length. There is also less danger from a bursting steam pipe than from the return water pipe, should it give out. Escaping steam, even though it comes from a large pipe, expends its force in a few feet, and unless one is directly in its course, and very close to it, will not be scalded; but with hot water escaping under pressure it is different; the water may be thrown to a great distance, and will penetrate clothing and parboil the unfortunate persons in its way before they can get relief, as the water will retain its heat until cooled by contact with something colder than itself. The reduced size of the hot water pipe compared with the steam pipe is in its favor, but of the two, the broken return pipe will be the most dangerous.

The departure from the common arrangements of the heating and ventilation of similar buildings, which Mr. Warren Briggs introduced into the Bridgeport High School, has made that building an object of much interest to the specialists in school construction. Since its occupation for school purposes last October it has been frequently examined, and, on the 21st inst., was thoroughly tested by Dr. D. F. Lincoln, the School Board, and other gentlemen, who were present by invitation for the purpose. We shall hereafter publish a report of the tests from the notes of our representative who was present.

DR. DOUCIT ON SEWER GAS.

We have received from Mr. T. O. Daley a note stating that, having observed our remarks that we should like to hear from Prof. D. D. Doucit (see SANITARY ENGINEER of Dec. 7th, '82, page 8) he had written him to that effect and received in return a communication which he took pleasure in forwarding. We print both of the enclosures contained in Mr. Daley's note, although we have some doubts as to whether the first one was not sent to us by mistake. Mr. Daley does not favor us with either his own address or that of his friend, but as he evidently reads the paper we will say that we would prefer to have some of Prof. Doucit's experiences as member of a board of health rather than any formal essays like the one which he has prepared for us.

PODUNK, *December* 16, 1882.

DEAR TIM: I got your note telling me that the SANITARY ENGINEER wanted to hear from me, and I have written the Editor a paper on Sin and Sewer Gas, which I enclose for you to forward. I hope it will suit him; but you can't mostly always sometimes tell about these editors. *I've been one myself.* Who is the Editor of the SANITARY ENGINEER anyhow, and what is his little game? I've made a pretty good thing out of hygiene, but not half as good as it might have been if other people had not stolen my ideas. The way I have been robbed is simply shameful. You remember how I got scooped in my National Health business. The National Board of Health tried to carry out my plan without consulting me, and a pretty mess they made of it. Why just look at the chance they had. Five hundred and fifty thousand dollars given them the first year!! And what did they do? Spent about one quarter of it and then expected to receive the rapturous approval of Congress for their economy!!! I tell you when I saw this in their first report it made me sick.

Why didn't some sensible man whisper in their ears in thunder tones to spend the whole of it. No doubt they see their folly now. Then see what a chance they had in the disinfectant business. Why they might have made five thousand dollars apiece as well as not.

I *know*, for I sent them a sample of one of the loveliest disinfectodorizers you ever saw—would take the smell out of a Philadelphia sewer contract in three minutes—and offered to go shares. And what do you suppose they did? Sent it to a chemist and published his analysis showing that it cost two cents a pound and was sold for fifty!

However it's no use crying over spilt milk.

But about this SANITARY ENGINEER. Is it a genuine thing, or only one of the regular old windmills—and if the latter, what grist is he trying to grind? I've not been in the sanitary line exactly for the last three or four years: part of the time I've been managing a patent fertilizer, and the rest has been taken up with the mineral water business and St. Judas's Oil; but if your friend wants some of the experiences of a veteran sanitarian he shall have them—for a consideration of course. If he will let me write a half column editorial notice of the oil for one issue I'll give him some inside views of a board of health that will be instructive.

Yours in haste, D. D. DOUCIT.

SIN AND SEWER GAS. SAFETY TO SOCIETY SOLELY FROM SANITATION. (Let this heading be well displayed—take the Chicago *Times* for a pattern).

Euphoristicus, the Dorian sage, taught that all diseases enter at the nostrils. Had he lived in this great and glorious country he could have found abundant proof of his belief. The investigations of distinguished modern philosophers prove that we are all being poisoned by sewer gas and that the race is rapidly being doomed to extinction. But frightful as it is to contemplate the ravages of diphtheria, ecthyma, dacryocystitis, microsporon and the thousand other ills caused by that demon lurking in our stationary washbowls, etc., I have to sound the note of warning of a still more terrible danger from the same cause. For the last year I have observed a deterioration, slight it is true, but still distinctly perceptible, in the moral tone and character of my brother-in-law. He has become sceptical and uncharitable, and seems to rather take pleasure than otherwise in the troubles of some of his best friends. This change dates from his occupancy of a fine new house fitted with all the modern conveniences. I persuaded him, a few days ago, to let me make a minute inspection of the drainage of this establishment. I found he had nothing but common water traps in the house and the sewer gas was being absorbed on one side of these and pouring up into the house in dense clouds on the other. I warned him of his peril, but it was not until I got home that I realized the astounding importance of the discovery I had made.

Where is it that sin and crime are rampant? In sewered cities. Where is it that political jobbery is most complained of, that savings banks collapse and cashiers elope, that pickpockets congregate and drunkenness abounds? In the sewered cities where the skin plumbers do congregate. And then I saw that this conflict between Religion and Science that the papers have been discussing is nothing to the conflict between morality and sewer gas.

[We consider the above a sufficient sample of Prof. Doucit's style and omit the rest for want of space. On the whole we prefer his letters.—Ed. SANITARY ENGINEER].

VIOLATIONS OF THE PLUMBING LAW.

Our recent public exposures of gross violations of the plumbing law and the subsequent vigorous action of the Board of Health in dealing with "skin" plumbers seems to be having a good effect. No serious cases were reported last week, and but few trivial ones, as follows: By Inspector Hooper, five; by Inspector Hollick, two; and by Inspectors Eagleson & Golden, one each.

Plumber John F. Crotty was arrested on the 23d inst., for the work on Alexander avenue, which we described two weeks ago. He waived examination and gave bail to appear before the Court of Special Sessions. Plumber McDougal, whose arrest we noticed last week, also gave bail at a preliminary hearing on the 23d.

The State Board of Health has commenced prosecutions against the following persons for selling adulterated foods: C. Sinnigen, 1002 Second avenue; S. S. Steiermann, 926 Second avenue; and P. Greifenstein, 833 Second avenue; for selling mustard containing flour, which was not sold as a mixture. John O'Connor, 838 Tenth avenue, plead guilty to the charge of selling coffee adulterated with chicory. He stated that he did not know it was an offense. The cases will come up for trial at the Court of Special Sessions.

The trustees of the public school of Asbury Park and the Board of Health have united in adopting a plan to prevent any child who can convey a contagious disease from attending school. The principal reports all cases of absence due to sickness of contagious character to the Board of Health. The Board of Health then, at their discretion, direct the principal to exclude all pupils affected with the disease or coming from the same family for a period fixed by the Board of Health.

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SANITARY ARRANGEMENTS IN THE RESIDENCE OF MR. CORNELIUS VANDERBILT.

(Continued from Page 4.)

V.—Housemaids' Sinks.

In enumerating the fixtures in the basement, two wash-hand basins in retiring rooms adjoining the billiard room were not mentioned. Both have 2-inch waste pipes and 2-inch air pipes from the crowns of the traps. The hot and cold water supply pipes are ½-inch brass, and on each is an air chamber consisting of about two feet of 1-inch brass pipe.

The fixtures remaining to be described form one of the most interesting features in the plumbing of this house. With the exception of that in the servants' bath room, on the fourth floor, all the housemaids' or slop sinks are in a single vertical line extending from the basement to the third floor, and occupying the well-hole of the servants' stairway. Fig. 1 is a front elevation of the sink on the second floor and the connecting pipes, as they appeared before the marble slabs were in place.

The sink is of enameled iron. The outlet is through a grated opening in the centre of the bottom, eight inches in diameter, into the top of a funnel-shaped connection with the 4-inch lead waste pipe *a*, having a 4-inch cleaning screw *b* in the safe over the crown of the trap. A 2-inch lead pipe *c* leaves the side of the waste pipe a few inches beyond the trap and enters the 3-inch iron air pipe *d*, which receives the branch air pipes from all the other traps on this line, and enters the 5-inch soil pipe *e* above the highest branch. The safe waste *f* is 1¼-inch galvanized iron, connecting with a vertical pipe *g*, of the same size, to which branches from all the other safes of this line are connected, and which ends over a sink in the cellar, being trapped at its lowest end, like all the safe wastes, by a loop in the pipe and a valve, as shown in The Sanitary Engineer of April 27, 1882 (Vol. V., p. 460). From the funnel-shaped iron connection, between the sink and the waste pipe, is taken a 2-inch lead pipe *h*, which is connected with a 3-inch galvanized iron pipe *i*, which is in turn connected with a larger galvanized iron pipe *k*, for the purpose of ventilating the space above the trap. The main pipe, *k*, starts at three inches in diameter from the lowest sink and increases in size just above each branch, reaching a diameter of six inches above the highest sink. It is not connected with a heated flue nor has it other means for causing an upward draft, except a common ventilating cap on its end above the roof.

The water supply to this sink (on the third floor) is from both the street and tank pressure, as explained by the following index to the letters on the smaller pipes in the drawing. All these pipes are of brass. The main line of street pressure, cold, for these sinks alone, is one inch in inside diameter and marked *l*; the branch to the faucet is l_1, which is ¾-inch. The corresponding pipes *m* and m_1, on the other side, are from the tank. Both are connected with the same faucet by stop cocks. In the same way the street-pressure hot (main line one inch and branch ¾-inch), marked *n* and n_1, and the tank hot, *o* and o_1, are connected with the other faucet. The latter have return circulation pipes (½-inch) *p* and p_1, and *q* and q_1. There are air chambers on both hot and cold supplies, consisting of brass pipes one inch in diameter and about two feet long.

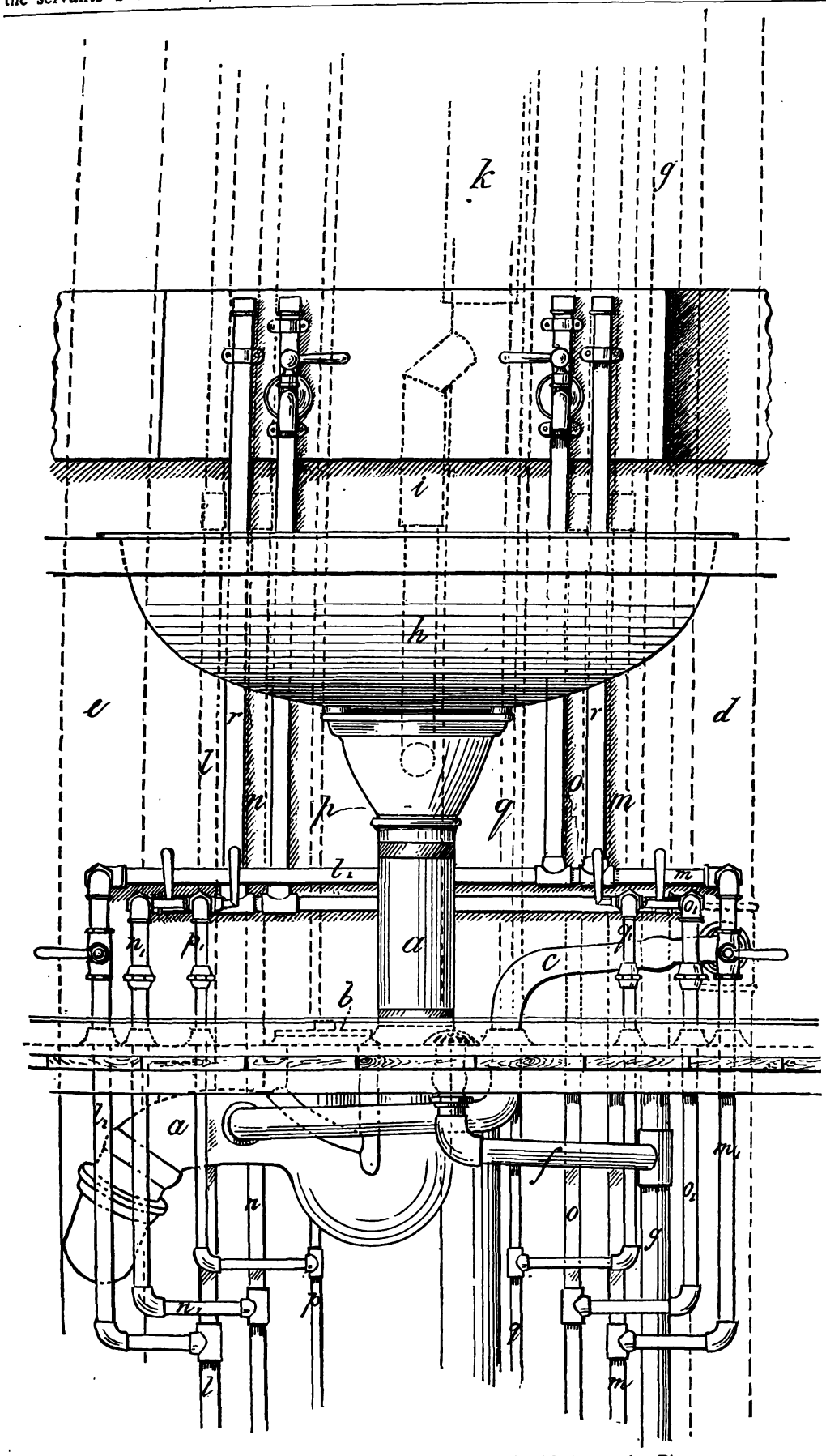

Figure 1. Front Elevation of Housemaids' Sink with Connecting Pipes.

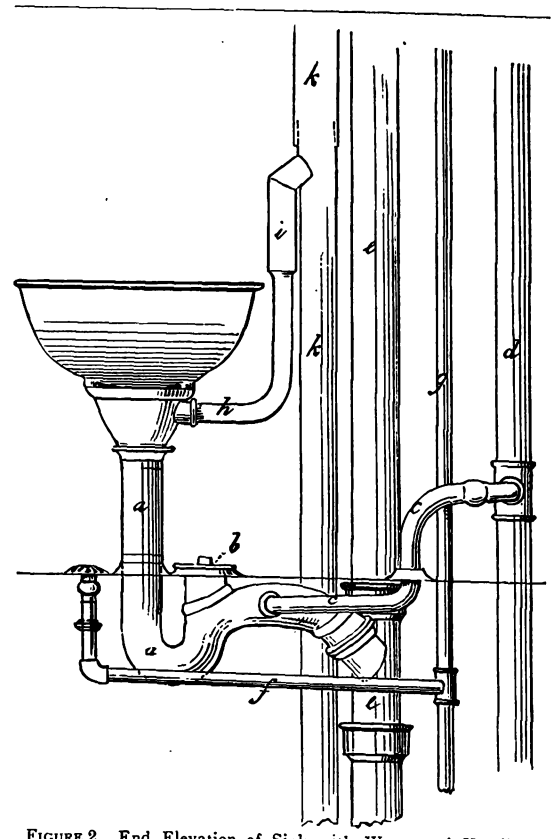

Figure 2. End Elevation of Sink with Waste and Ventilating Pipes only.

Fig. 2 is an end elevation of the sink, and waste and ventilating pipes alone, to show that part more clearly. The same letters are used for the same pipes as in the larger drawing.

The safes and the single floors which they cover are the only divisions between successive sinks, so that the traps and pipes of the sink above are seen at the top of the closet enclosing the next below. The space under the sink and above the safe is not accessible except by unscrewing the wooden casing in front. Wooden doors slide down in front of the sink, hiding it entirely when not in use.

[To be Continued.]

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SCHOOLS IN RELATION TO INFECTIOUS DISEASE.

The London *Practitioner* of November last contains a good paper on School Attendance in its relations to outbreaks of infectious disease, by Dr. David Page, Medical Officer of Health to the District of Westmoreland, who very truly says that "in a large majority of cases there is a risk of undue prominence being given to school closing, to the subordination and practical neglect of those other measures which are more peculiarly the preventive weapons of efficient sanitary organization." "The exceptional cases in which the closing of a school is a matter of necessity are of two classes—first, those in which the school itself has clearly become a centre or starting point of infection; and second, schools existing under circumstances difficult of control. In the first case it is only necessary to close the school for such time as is necessary to secure thorough disinfection and purification, which usually will not require more than a week or ten days. Schools of the second class belong more especially to rural districts, and the causes for which these closures become necessary are usually scarlet fever or diphtheria. In the management of boarding-schools and similar institutions, every thing depends on dealing promptly with the first cases of sickness.

"In ninety-nine cases out of a hundred, the history of the introduction, say, of scarlatina into a boarding-school, is the return of a boy after the holidays, with the fever in his system. In a day or two the disorder declares itself, and then is the time for proving the necessity as well as the value of isolation. Every school of this class ought to have a sanitarium, or detached house, in constant readiness for such emergencies. Not only should the boy, his clothes, and his bedding, be forthwith removed to such a place, but his next companions should be kept under observation and apart from the rest of the school, as it is amongst their number that subsequent cases, if any, will appear. In large public schools where the boys are located in several houses, the isolation should extend to the whole of the house in which the first case has broken out. These precautions may appear somewhat strict to those who have had no experience of outbreaks of fever in public institutions, but my acquaintance with the results, painful, annoying, and costly, of their neglect, has convinced me that the utmost practicable precautions—and these cited are practicable enough—that can be taken at such a time can err only on the side of laxity.

"In the event of an outbreak of fever in a boarding-school, no boy should be suffered to return to his home until after a term of isolation, equal to the maximum latent stage of the disorder.

"The circumstances which may be held to justify the continuance of day schools during the prevalence of scarlatina, are those wherein the children would be otherwise exposed to much risk in playing about the doors, with children belonging to infected families, and chiefly with children barely recovered from illness. Under these circumstances, always provided that due supervision over infected families is maintained, a child runs less risk in regular attendance at school. This is particularly true in regard to town and village schools, as distinguished from the smaller schools of scattered country districts, where the children coming from all points and from considerable distances are brought together only during school hours. In these latter, the breaking up of the school during prevalence of scarlatina, is, in my experience, the best and safest course."

CIRCULATION OF SEWER AIR.

The difficulties in the way of judging of the circulation of the air in sewers from a purely theoretical standpoint, together with the importance of this subject, has led several gentlemen in Munich to make actual examinations in sewers of the town under varying conditions. The causes affecting the circulation are so numerous, so changing and often even indeterminable, that a practical investigation of results seemed to them to be the only satisfactory and reliable way of obtaining safe conclusions. The first observations were made by Rozsahegyi * during the summer months of 1880.

Dr. Soyka has extended the experiments during the winter months of 1881 to 1882, and his results, together with a comparison of the two series, have lately been published.†

* See SANITARY ENGINEER, Vol. IV., page 401.

† *Zeitschrift für Biologie*, 1882.

The more important conclusions arrived at by Rozsahegyi were that in summer the flow of sewer air was much oftener downwards than upwards, and was more rapid in sewers of lower than in those of higher districts. The direction of winds had no perceptible influence. The difference of temperatures between the air in the sewer and the street would not explain the directions of the current, which seemed to be controlled more by the flow of the sewage.

Dr. Soyka's experiments were confined to the same sewers, but made on very cold days. As the two series give a very instructive collection of actual facts, we shall now present them more fully. The method of observing was as follows: After entering the sewer the man-hole cover was closed so as to preserve the usual condition. The temperature of the air outside and inside and of the sewage was noted. The humidity of the sewer air and the quantity and depth of sewage were likewise recorded. The circulation of air was measured in quantity and quality. In quality, by observing the directions in which smoke from small torches was carried away at different parts of the cross-section and at house and other connections; in quantity by measuring the currents with very delicate anemometers. The intensity and extension of gases artificially introduced, was tested at important points. Sulphureted hydrogen was used for the purpose, and developed in the sewer by placing some sulphuret of iron in a large basin supported at the centre of the sewer, and pouring acid upon it when ready for the observation. The reaction was obtained on sheet lead held at various distances. The hours selected for the work were from nine to one o'clock and extended over 16 days.

The sewers themselves, four in number, are briefly described as follows, in metrical measure.

1. The sections varied from 1.2 × 0.8 to 1.5 × 1.00; the length was 567 metres and the grade 1 : 1000.
2. The section was 2.04 × 1.16; the length was 400 metres, the grades 1 : 755 and 1 : 710.
3. The sections were 1.5 × .84 and 1.47 × .82; the length 550 metres, the grades 1 : 1,000 and 1 : 520.
4. The section was 1.64 × .79, the length 300 metres, the grade 1 : 63.

The results are recorded with great detail together with all the conditions that were supposed to have any influence on the movement of the sewer air. As it would require considerable space to enter into the minutiæ of Soyka's interesting and valuable work, we shall give our readers only the gist of his discussion upon them and his conclusions.

After stating the experimental results he enters very fully into an examination of the forces affecting the circulation of the air in sewers.

In the first place, he touches the influence of the winds. It is found that, while a strong wind blowing into the sewer outlet can undoubtedly cause an upward current, the effect is confined only to a short distance, owing to the open man-holes, which prevent an excess of pressure and to the exhausting power of winds when passing over the gratings.

The second examination pertains to the specific gravity of sewer gases, which is dependent on their chemical and physical properties, their temperature and the pressure under which they are held. A careful and exhausting inquiry is made with reference to the assertion that because sewer air is usually saturated with moisture and therefore lighter specifically, than the atmosphere, it must rise in the sewers. Dr. Soyka clearly shows that the changes of weight caused by the usual differences of temperature between the air in the sewers and outside and by the greater amount of carbonic acid in the former, make this theoretical supposition appear quite insignificant and of no practical value. Again, it is asked whether the admixture of other and lighter gases could not reverse this result, and it is found that in properly designed and flushed sewers very few gases were noticeable. The largest contingent by far is furnished by carbonic acid; besides this only ammonia and sulphureted hydrogen need to be considered. The former is lighter and the latter heavier than air, so that they tend to compensate each other, and their small quantities will not materially affect the increase of weight due to the carbonic acid alone.

No perceptible influence was found to be due to a difference of barometric pressure at the lower and higher ends of the sewers, on account of the ventilating man-holes which at once could compensate any effects.

The influence of the difference of temperature is inquired into very minutely under varying conditions, such as a sewer being open only at both ends, or having perforated man-holes in addition. The results show this influence to be a factor of considerable force. It is found to be reduced considerably from its theoretical magnitude by the uncertain friction at turns, junctions and changes of sections, and its effect is even often reversed by untrapped house drains, especially during the winter months.

Another factor affecting the circulation of sewer air is the flow of the sewage. Experiments were made with a small pipe two inches in diameter, as well as in the sewers. The influence was found in all cases to increase with the velocity of the water, with its relative height and breadth of surface; yet it is argued that in ordinary sewers it could never give the air a velocity greater than half that of the sewage.

Finally, Dr. Soyka devotes a few paragraphs to the question of the forcing of traps from the sewer side, and shows theoretically that in a ventilated sewer no conditions could occur which would seriously affect a seal of even two inches only.

In summing up the most important relations which govern the circulation of the air in sewers based on the Munich experiments, Dr. Soyka states the conclusions about as follows:

It must first of all be asserted that under ordinary conditions a system of sewers such as the one examined can show no constancy nor uniformity in the circulation of the air, either in the sewers themselves, nor in the connections with houses and streets, in the junctions and outfalls. This is shown clearly when comparing the circulation at different seasons, at different conditions of the atmosphere, and even at different hours of the same day. It happens even that in one sewer at the same time the currents of air can be in different directions, owing to the large number of openings for ventilation into the street, the untrapped house drains and other conditions, which cause local currents independent of those in neighboring sections.

Among the factors which cause a movement of air, a difference in its temperature must take a leading place. The atmosphere and sewer air will differ more or less in this respect nearly all the time. In summer the atmosphere is warmer, in winter it is colder.

Therefore the sewer air should show sometimes an upward, sometimes a downward motion. In winter the lighter sewer air should rise to the higher end, in summer it should flow to the lower one.

But this tendency is counteracted by a number of powerful influences, so that the actual observed motion is often contrary to what theoretically on the above grounds might be expected.

Differences of temperatures at certain points may themselves be a cause. Where the house drains are not trapped and are carried beyond the roof, the temperature of the house affecting the soil pipe will impel the air to be drawn in or expelled at the sewer connection, as the case may be, and influence the movement of the air in the common sewer. In fact, when many house drains in a sewer act in the same way, the combined force may even reverse the current otherwise found in the sewer. Such factors must be considered, when it is intended by means of special ventilating arrangements, such as stacks, to prescribe a certain course to the air, otherwise results varying from those expected will occur.

The assertion that sewer air should have an upward tendency because of its being lighter on account of the greater degree of humidity, is not sustained. This result could only happen when the temperatures of both sewer and outer air are about the same, which rarely occurs. The changes of weight caused by the changes of temperature are much greater than those caused by the degree of humidity. It is therefore of little influence and is moreover fully nullified by the physical and chemical actions of the sewer air.

The sewage itself flowing along the bottom of the sewer with a constant stream of slightly varying quantity, imparts its motion to the air above it, and thus sometimes acts with, at other times against, the effects of temperature. The relative importance of this influence depends on the relative quantities of air and of exposed surface of the sewage. In large sewers the motive power of the sewage is usually less than that of the differences of temperature; in small ones it is often greater.

Dr. Soyka concludes with the remarks that, if the observations made in Munich can be applied to other localities, then it is not possible, in view of the constant changes in the circulation of sewer air, caused by natural conditions of climate and the usual and proper design of the sewers, that this air and the gases it carries should be the special cause of epidemics spreading into certain definite localities and definite directions.

Regarding the latter, we might say that while this conclusion is arrived at mainly through a controversy still active in Germany and France, as to whether fæcal matter should be discharged into sewers or carried away in pails or other separate manner, it is no less valuable to those countries which advocate water carriage without question. But we should like to emphasize the provision made by Dr. Soyka, as to his conclusion being valid only when the sewers are properly designed. The want of the necessary skill in this direction might still, as has been shown in England, contribute towards the propagation of epidemics in certain otherwise protected localities.

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THE STEAM PIPES IN NEW YORK STREETS.

NEW YORK, N. Y., *Dec.* 19, 1882,

To the Editor of THE SANITARY ENGINEER :

To your strictures on inspectors and contractors in your editorial on "The Streets of New York," which appeared in your paper of December 7, you should have added that for work outside the curbstone no contract should be made for doing any part; one of the companies, if I am properly informed, did sub-let some work—digging and filling.

Your suggestion for concert of action is a good one, but it is almost too much to expect that rival systems and rival companies will willingly assist such an arrangement, and without their coöperation, at least during their chrysalis state, is it possible to establish a *modus operandi* by which such a regulation could be carried out?

An objection which I heard made to your suggestion of a sub-way was its magnitude, and that in many places it could not be drained, and would necessitate a special system of sewerage. To this might be answered that the space under sidewalks, which properly belongs to the streets, should be given up in the narrow down town streets and elsewhere, if required, upon a just and equitable settlement, and that the city should arch and build the sub-ways and keep them in repair, as they do sewers and pavements, and give *allotted* space within them for public improvements (not including explosive compounds, which are safer buried in the earth.)

But, sir, the sub-way is a thing of the future, and the repeated tearing up of the street is of to-day. *Why is it that there is a necessity to remodel some of the work, and is this remodelling to go on all winter under the name of repairs, and will the alteration improve matters?*

As you may be aware, there is a great difference in matters of detail between the two steam companies, an approximate sketch of each of which systems I submit—Fig. *A* being the American and Fig. *B* the New York. In general, both send out steam through wrought iron mains, and the New York is receiving back a large quantity of its condensed water (all that is not used in the engines) through a parallel main, and the American company have parallel mains through which they intend to receive back what water they can when they are in working order.

System *A* has three pipes, two (1 and 2) being the conveying pipes, and one (3) the return pipe, but in many places the conveying pipes are supplemented by distributing pipes, which start from the flanges (*f*) at the junction and run parallel with the other pipes, while in other places the conveying pipe does duty for both purposes. Pipes 1 and 2 are connected with the eight-branch cross (junction) with a stop valve *c*, and an expansion joint *d*, the expansion joints; though it may be with the expansion joints of the steam pipes as well. When expansion takes place, the thrust of the long pipe, caused by expansion when heated, is against the lower elbow, and the resistance from the pressure within the pipe is against the upper elbow, the thrust not being in a right line, but angular, causing the brass of the slip joint to bind on the sides of the sleeve. The sketch *C* will give an idea of this, in a better manner than words can. The thrust of the pipe is in the direction of the arrow *a'*, and the resistance from the pressure and from the friction of the gland is in the direction of the arrow *b'*, which causes the offset to assume the position shown; binding the brass at *c* and *c'*, in such a manner that it is almost impossible to move it, the result being the fracturing of pipes or elbows. The dotted lines *e'* shows the bent pipes (offsets) which are being substitated in places for the elbows and piece *d'*.

Fig. A.

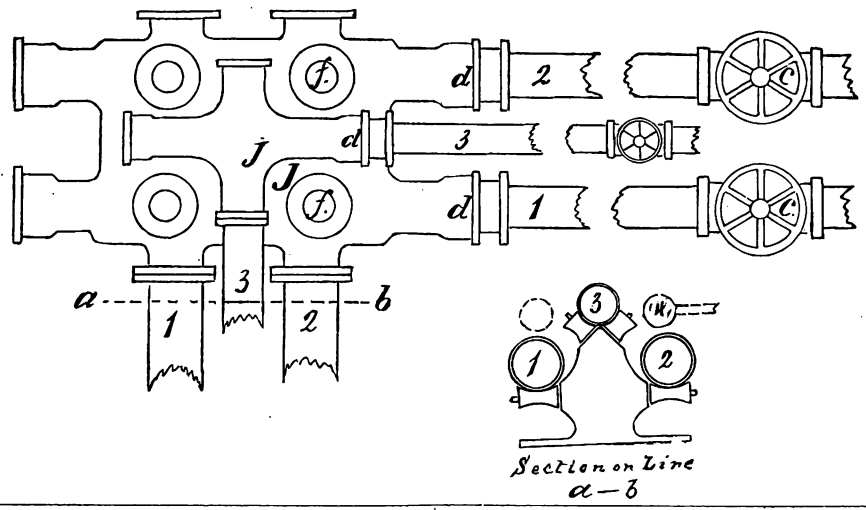


Fig. B.

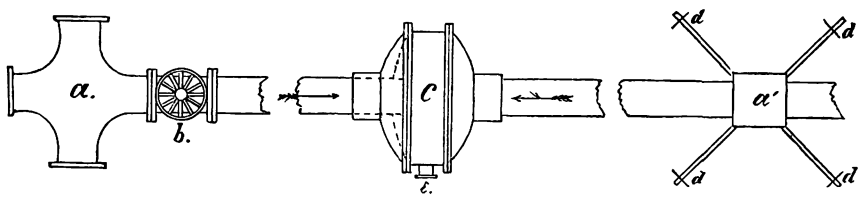
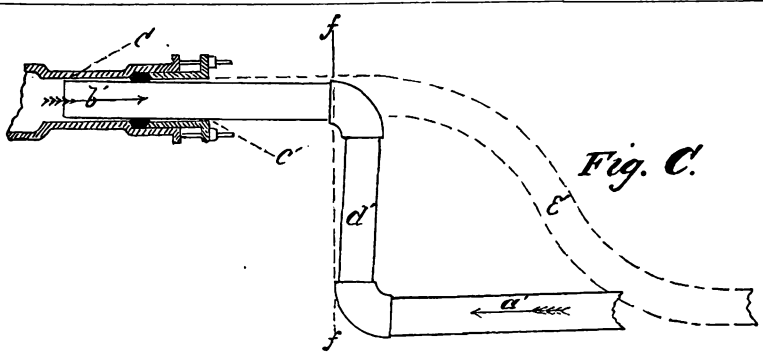


Fig. C.



The duplicate system used by the American Company presents features not covered by the New York Company's method, and might be used as an argument of their inventions *not to do things cheaply*, but it is questionable if what can be gained in the way of preventing interruptions will warrant the expense and complication where the street blocks are as short as in the lower districts.

Yours, very respectfully, T.

[Our correspondent is a man who has extended experience in the matters he discusses, and his suggestions are entitled to consideration.—ED. SAN. ENG.]

Food and Drugs.

FOOD AND DRUG PRESCRIPTIONS.

To the Editor of THE SANITARY ENGINEER :

In your issue of Dec. 14, 1882, are two articles referring to prosecutions under the new food and drug law in this State. It is very properly urged that the analysts of the State Board of Health should fix and publish standards of strength and purity for articles of food or medicine.

But I would suggest further, that it is due to all parties concerned that the analysts appointed to make these investigations and to prescribe standards, should also give in detail the methods of analysis whereby they work. They should state that a certain article tested in a certain manner should be proven to contain a certain amount of the substance sought. The new U. S. Pharmacopœia illustrates this method of making definite requirements of purity or percentage based upon definite methods of assay: good illustrations are the assay methods for opium, cinchona barks, alkaloids, and salts, sweet spirits of nitre, the acids, salts, etc.

Unless some such method of basing requirements upon definite methods of assay is adopted for the more important foods and drugs, we shall soon find every public and private analyst a law unto himself, and the reports of our prosecutions will be as farcical as much that has been recorded in England. Very many of the disagreements between English analysts have arisen from the use of methods radically different, and, frequently, radically incorrect.

Although there has been in that country an analytical court of final appeal, which seems to have been administered in a conservative and able manner, there has been no corporate body with the right and power to prescribe methods of analysis as well as standards of strength and purity.

The writer has had some experience in the analysis of commercial foods and drugs, and is every day more and more impressed with the fact that many accepted methods of analysis are open to criticism, and, where interpreted too literally, are liable to lead to false conclusions. For instance, the literature of pharmacy abounds with schemes for the assay of opium and cinchona barks; but any competent analyst knows from experience that only about one article out of every hundred contains really valuable information. In like manner we see articles in the various secular and scientific journals to the effect that Prof. So-and-So has examined a large number of samples of this or that, and has found all to be adulterated. Upon closer investigation the fact is developed that the method of analysis, upon which these statements were based, was faulty. Instance the assay of laudanum by simple evaporation, and the assay of quinine pills by use of the microscope alone!

It is not my belief that any of the analysts of our State Board of Health would make such palpable mistakes; in

* The expansion joint used is not a slip joint; its principle is a flexible diaphragm.

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fact, there is every reason to believe that they are well qualified not only to prescribe limits but also to prescribe methods of assay. But there is naturally more or less uneasiness as well as uncertainty among conscientious manufacturers lest they be judged by wrong standards or wrong methods of assay. Every careful manufacturer has his own methods for testing the preparations which he makes or buys. It is probable that these methods may not always be the most refined and accurate, yet they are the ones by which the trade has been guided, and to suddenly proclaim standards of strength without also prescribing methods of assay would cause more or less confusion.

But aside from this, the party accused is entitled to know the grounds upon which the accusation is based. Naturally the facts will be elicited during an important trial where considerable is at stake, but in petty cases a party morally innocent, yet declared technically guilty upon the evidence of the analyst, may prefer paying his fine to contesting the matter.

An early publication of standards and methods of valuation will be of great interest, and will doubtless prevent many unwitting infractions of the law as interpreted by the analysts.

In conclusion, the gentlemen who are charged with these important duties can do much to improve the application of scientific methods to the examination of foods and drugs, and can accomplish a great deal in the direction of furnishing the public with purer goods. They can depend upon cordial support from all fair-minded manufacturers and citizens.

Very respectfully yours,

HENRY B. PARSONS.

NEW YORK, *Dec.* 16, 1882.

RETAIL AND WHOLESALE GROCERS AND THE PROSECUTIONS.

The *German American Grocer*, which is the official organ of the New York Retail Grocers' Union, says, "The grocers do not want to fight the law; on the contrary they want to sell pure unadulterated goods, not only because their profits will not diminish by so doing, but also, and mainly, as a principle of honest dealing."

It is, however, inclined to find fault because the first prosecutions were brought against retail dealers. A moment's reflection should make it apparent that the Inspectors of the Board of Health must buy their samples in small quantities and as usually sold at retail stores. So long as the retail grocer sells adulterated articles he is liable to prosecution, and because some one else does the same is no excuse for him. It does seem a little hard that the grocer who supposes the goods he sells to be pure, should be prosecuted before the manufacturer who fraudulently adulterates the goods. At the same time such a course seems quite unavoidable. A single manufacturer may sell to fifty retail grocers, and the chances of finding adulated goods are very greatly increased by buying of the latter class. Then again it is, as a rule, difficult to get small quantities from the wholesale dealers or manufacturers. It involves a useless expenditure to buy five or ten pounds of an article for analysis, while a few ounces are amply sufficient. An Inspector who applied to a manufacturer for a quarter of a pound of cream of tartar would naturally be regarded with suspicion, and if he was served at all, it would doubtless be with a genuine article, whereas there might be hundreds of pounds of the article adulterated in the place.

The grocers who have been prosecuted will have an opportunity at the trial to state their case, and we sincerely hope that the wholesale dealers, who are really the parties at fault, will be thoroughly advertised and prosecuted by the "Union." There are plenty of wholesale dealers who represent their goods for just what they are, and we shall be surprised if the dishonest ones under the pressure thus brought to bear upon them do not find it to their advantage to mend their ways.

The action of the State Board of Health must not be considered as in any way a persecution of the retail grocers.

The evil exists, and the Board has taken what seems to it the best means for checking it.

The *American Grocer*, the leading grocery paper in this country, in commenting on the recent arrests for violation of the food adulteration law of this State, gives the following very sound advice to the retail grocers. If they are wise they will follow it and spend their money in suing those who have fraudulently sold them debased goods instead of wasting it in attempts to resist the operation of the law.

"Fully one year and a half has elapsed since the act was passed and there is no excuse for any retail grocer being ignorant of its provisions. Not only has it been noticed in the daily press, but it has been published in detail by trade papers, and its provisions made known by individual effort.

"We have no doubt that in many cases grocers are unaware of the extent to which certain articles of food offered for sale are debased by adulteration. And yet for a grocer to confess, in these days of cheap news and active competition, that he is not posted as to the quality of the goods he handles, is to convict himself of an ignorance that is little short of criminal.

"We hope the warfare against the sellers of the infamous compounds sold as cream of tartar will be vigorously carried on amongst the apothecaries. Would it not have been better to have commenced with the manufacturers of impure articles of food, rather than with the retailers? It may be that the manufacturers are not as accessible to the officers of the State as the retailers. It would be well, however, for retailers to remember that they have an unquestioned right, where they buy goods sold to them as pure, but in reality adulterated, to sue the seller, whether manufacturer or wholesale dealer, for damages.

"Every true merchant is interested in seeing the Adulteration Act enforced with vigor. It will serve to stop in this State the sale of adulterated goods manufactured out of the State. It will compel manufacturers and jobbers to keep goods that comply with the provisions of the act, otherwise they become parties to the annoyance and arrest of the retailers. There is just one lesson to be learned from this first arrest. Buy the best goods from reliable houses and take pride in keeping only the best articles. Educate consumers up to a high standard by circulating information in regard to debased food. In short, obey the new law, not only because it is a statute, but from self-interest."

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Dec. 23.....	24.42	18.62	20.46	26.00	28.99	19.60

E. G. LOVE, Ph.D., *Gas Examiner.*

NEW PROCESSES OF GAS MANUFACTURE.

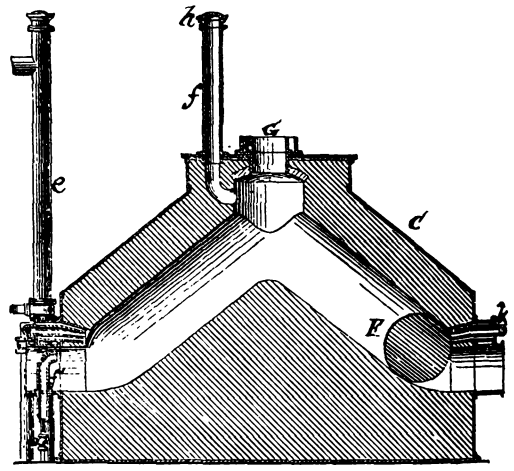
The advent of another gas company in this city, recently referred to in these columns, has suggested that a description and discussion of the process by which it is proposed to make gas of a better quality and at less cost than by existing methods, would be interesting to our readers. The following has therefore been prepared with that object in view.

The Equitable Company, whose President is Mr. Edward Stern, holds three patents issued to C. M. Tessié du Motay in 1880. These patents are similar in most particulars, and relate to a process for producing hydrogen gas. It is proposed to decompose, by means of highly heated caustic lime, a mixture of steam and naphtha vapor, or other gaseous substance containing carbon. The mixture of steam and naphtha vapor is first passed through a superheater, after which it enters the converting furnace. This, as shown in the accompanying illustration, consists of an inverted V-shaped chamber which is filled with caustic lime through the opening at the top. The patent states that "the furnace is made in two parts, with the object of having one portion cooler than the other."

The contents of this chamber must be heated to a high temperature by gas from a separate generator. This done, the mixture of steam and naphtha vapor is allowed to enter at one end, which is supposed to be the hotter part, and passing through the lime in the first arm of the chamber is decomposed with the formation of hydrogen and carbonic acid. "This carbonic acid is subsequently taken up by the lime in the cooler portion of the double furnace, the lime in the first portion being too hot to enter into combination with carbonic acid and form carbonate of lime."

When the temperature of the lime becomes so low that the decomposition is not effected, the flow of steam and naphtha is diverted into another similar furnace, the carbonate of lime in the chamber is rendered caustic again by contact with combustible gases from the separate generator. In this way the process is intended to be continuous—the same line acting over and over again without removal from the chamber. Indeed, the patent states as the most important improvement of the process, the reconversion of the carbonate of lime into lime. It is also claimed that "heated brick or other similar substance" will not take the place of the lime in the decomposition of the gaseous mixture. With lime the resulting products are hydrogen and carbonic acid, while with other material hydrogen and carbonic oxide would be produced.

It hardly seems probable that any intelligent engineer would undertake to manufacture gas in this way, with the slightest idea of making it a commercial success. If experience teaches anything, it certainly is not saying too much to assert that a commercial gas cannot be made by the process as described in the patents. In the first place in heating the lime in the chambers is it possible to heat one branch to a temperature which will effect the decomposition of steam without at the same time heating the other branch to a very high temperature—a temperature at least which would not permit the absorption of carbonic acid to any extent? Moreover, it appears clear that even though the lime in one part of the chamber was cooler at the start, it would soon be raised to a very high temperature by the gases which come from the other part, and which are heated to a point necessary for the decomposition of steam. We are asked to believe that lime will take up carbonic acid at a temperature at about which the carbonate of lime would itself be decomposed. Besides all this, we have the oft-repeated chemical fact that lime will not absorb carbonic acid unless it is in the hydrated form. It is useless to claim that the lime in the chamber in question would be hydrated even though an excess of steam were mixed with the hydrocarbon vapor. We are at a loss to understand why any refractory material would not answer as well as lime in the chamber. No chemical change takes place in the lime, nor does it aid



in the decomposition of the steam in any way except to offer greater heated surface. The assertion that carbonic acid is produced in one case and carbonic oxide in the other simply means that in the latter the oxygen is deficient. Introduce a little air or an excess of steam and carbonic acid will result.

Of the three patents mentioned, the first involves the use of steam and naphtha; the second, steam and water gas; and the third, steam and coal gas. The object of the naphtha is to furnish carbon with which the oxygen can unite, thus liberating hydrogen, which is claimed to be the principal constituent in the commercial gas. Is naphtha the cheapest form in which the necessary carbon can be furnished?

In the second patent "water gas" is substituted for the naphtha. Why not introduce an excess of steam in making the "water gas" and produce carbonic acid at once? For the simple reason that it would take a large part of the profits of the manufacture to remove the carbonic acid. If "water gas," enriched with naphtha, cannot be sold for less than $2.25 per thousand feet, does it seem probable that the crude gas can be reduced fully one-third in volume by the removal of the carbonic oxide—to say nothing of the expense attending such a course—afterwards enriched with naphtha to acquire illuminants, and then be sold at a lower price than the original water gas.

The proposition to employ a mixture of coal gas and steam is even worse than those already noticed.

The only document of any value which we have seen, of those sent out by the Equitable Company in support of their claims, is a report of some experiments made by Mr. W. H. Bradley at the Municipal Gas Works, and this

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report shows most conclusively the impracticability of the scheme.

Mr. Bradley made some experiments with the inverted V-shaped chamber already mentioned, and found "that the steam and hydrocarbon vapor did not come in contact with the heated lime sufficiently to effect its decomposition." After two months' trial the apparatus was abandoned and a new apparatus devised. This consisted of two vertical chambers of iron lined with fire brick, which were filled with caustic lime, and manipulated in the manner already described. While it was possible to decompose the steam in contact with naphtha vapor, and by an excess of steam, get a mixture of hydrogen and carbonic acid, with a little carbonic oxide, it was found impossible to remove the carbonic acid by the heated lime, and purification by the ordinary methods were rendered necessary. It would be possible to purify the mixed gases by hydrated lime, but the temperature of the gases would have to be greatly reduced, and as the report says the cost of such purification "would be something enormous," and quite fatal to the process.

This is in substance the process by which the Equitable Company proposes to furnish cheap gas to consumers. Even from this general consideration of the subject there appears to be no reasonable grounds for supposing that in its present form it will prove anything but a failure.

Meter-ites.

The new National Petroleum Exchange, of New York, was opened December 18.

The electric lamps which have been used for a year at the York railway station have been replaced by Bray's gas burners, on account of the greater cost of the electric light.

The Special Committee of the Gas Institute received contributions of upwards of $30 000 in one week recently, for their expenses in connection with the International Electric and Gas Exhibition at the Crystal Palace.

Some of the strongest objections to the smoke nuisance in Chicago have been directed against the public schools, until the Board of Education have at last ordered smoke consumers of several makers to be applied to the boilers of the schools which have been most complained of.

Still another gas company is in the field in this city. The Excelsior Gas Light Company has asked permission to lay mains in the streets, and promises to charge small consumers $1.50 to $1.75 per 1,000 cubic feet, and large consumers $1.00. Time will tell.

The *Gas Engineer* says that the experiments going on at Gartsherrie in obtaining tar and ammonia from the blast furnaces, are showing good results, and other iron masters are adopting the process. The cost of apparatus is £5,000 per furnace; the annual profit is estimated at double that sum.

The Siemens' regenerative gas lamp is being introduced into the large manufactories and ship-yards on the Clyde. A firm of ship-builders at Dumbarton has two 600 candle power lamps; a Point house ship-yard has four of 330 candle power, and several others are in use in other establishments. A lamp of 800 candle-power is to be set up in St. Vincent's Place, Glasgow.

ELECTIC LIGHT NOTES.

The Western Underground Electric Company broke ground in Chicago last week for laying pipes for underground telegraph wires.

Edison lamps are used in lighting the Society of Arts rooms, in London. A Siemens' dynamo, driven by an eight horse power Crossley gas engine, furnishes the current. Fifty of the lamps are at present in use.

Two hundred and fifty Edison lamps are now used in the editorial rooms of the Boston *Herald*. These lamps are also used in the Bijou Theatre in that city. There are 192 of them under a tin reflector just inside the proscenium arch; 140 under a similar reflector over the stage, 90 on the central chandelier of the auditorium, and 18 in each of two small chandeliers near the sides.

Superintendent Smith, of the Telegraph Bureau of this city, called the attention of the Fire Commissioners, last week, to the destruction of several magnet coils in fire alarm boxes, caused by electric light wires coming in contact with the wires of the Fire Department. Mr. Smith recommends that the offices of the electric lighting companies should be connected by telegraph with fire headquarters, in order that employés of the companies may go to fires and cut wires when they are in the way of the firemen.

The *Engineer* says that at a recent meeting of the Paris Academy of Sciences a paper was read on the "Results of Experiments Made at the Exhibition of Electricity on Incandescent Lamps," by MM. Allard and others. In general and for the spherical mean intensity of 1.20 Carcel, only about 12 to 13 Carcels per horse power of arc, or 10 Carcels per horse power of mechanical work, can be counted on, from incandesent lamps. Electric candles give 40 Carcels per horse power of arc, regulators nearly 100, so that, generally, the economic values of the three systems are nearly as one, three and seven.

AN INVENTOR WANTED.

One of the most important inventions now wanted is perfect ventilation for railway cars. Somebody will yet hit upon the exact thing wanted. It required nearly a half century to perfect an air break which would effectually and by a simple operation stop a railway train. But it was done at last. It required a quarter of a century to invent a sleeping car and to bring it to its present state of perfection. Then came the steel rail with the fish joint, and the improved locomotive, now almost a perfect machine. All these are wonderful improvements. But there has been no great improvement in the ventilation of railway passenger trains, although a hundred devices have been tried. The passenger in crossing the continent, or in traveling a few hundred miles, finds himself covered with dust. He emerges with a face covered with grime, with soiled clothes, and in a state of positive discomfort. If he travels across the continent, he is covered at one time with alkali dust, at another with white or yellow powdered clay. It pervades the cars and takes possession of the passengers. Whoever has noted the effect of driving snow storms in the Atlantic States knows how snow will be sifted into the most weatherly houses. It is driven under doors, under window casements and under the eaves of dwellings. Now dust is driven in the same way. No device has ever yet been applied which will effectually keep dust out and let fresh air in. The first step in the way of perfecting an invention is to make every window immovable. These should never be subjected to the caprice of the passenger. The window should be for the admission of light and nothing else. It should, therefore, be a fixture, fastened into the solid wood and made air-tight. Doors, also, should close without noise, but should be air-tight as to all the margins.

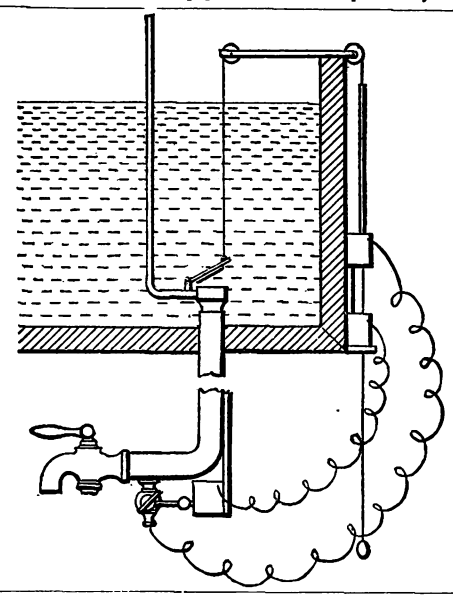
Shutting the dust out in this way means shutting out the air. The next step will be to get the air in entirely free from dust. By some inventions it is filtered through water. Ventilation of some sort can always be secured by the motion of cars against a resisting atmosphere. But how to obtain ventilation when the cars stop has been one of the difficulties. Just then passengers will be gasping for fresh air. Windows and doors having been made air-tight, ingress and egress to cars will present another difficulty. On some trains a hood or elastic cover between the cars is employed, the passenger entering at the side through an opening in the curtain or hood, the orifice closing after him, and then entering the car through a door supposed to close and become air-tight. The air is filtered in at the top of the car and falls down gently upon the pasaenger. But foul air must be pumped out as well Moreover, no ventilation of a passenger car can ever be perfect which is not effected when the car is stationary as well as when in motion. The air brake derives its power from the locomotive. It is reasonably clear that no device for ventilation will be perfect which does not depend upon the same source. The locomotive must supply ventilation just as the "doctor," or small cylinder supplies water to the boiler when the locomotive is stationary. The difficulties of perfect ventilation are further beset by the difficulty of shutting out dust. But at no distant day an inventor will come along with a plan so simple that the wonder will be it had never been hit upon before. Very likely the inventor will be a railroad man—one who knows just what is wanted, and who knows, also, just where all other inventions have come short of complete success.

The other great invention which the coming man will bring is a perfect pavement for heavy traffic. It is the old story in nearly every large city in the country. The best pavements are so expensive that they threaten bankruptcy. The poor ones are an abomination. There is not a well paved city in the United States if estimated by European standards. Wood and brick will be discarded as worthless pavements. Stone and iron are left for further experiments. Two good sidewalk pavements are now laid in this and some other cities, one of asphaltum and the other of concrete or manufactured flag stones. The difficulty is to hit upon a *good* pavement which is cheap, durable and comfortable. At this date nothing more effective has been found than blocks of hard stone laid on a bed of concrete, as such pavements are now laid in European cities. That is the point of departure for the inventor. How can the city roadway be made to meet all the demands of modern traffic together with economy, comfort and conformity to sanitary requirements? It must be remembered that in former times there never was such abrasion and wear of pavements as that now effected by the immense loads which in the interest of commerce, are constantly transported through the principal streets of large cities.—*San Francisco Bulletin.*

ELECTRIC ATTACHMENTS FOR WATER PIPES.

We quote the following from the English *Building News*: How far the application of electricity can be depended on to supplement the reliability of servants is a question. This idea is a clever one, but of its practical utility we are somewhat skeptical.

"A simple method of preventing the bursting of water pipes during frosty weather has recently been patented by Drs. Buxton and Ross, and was exhibited at the late Electrical Exhibition at the Crystal Palace. A valve of special construction is screwed or soldered into the end of the house main service pipe in the cistern, and a piece of string or wire conducted from it to any convenient spot, and fastened to a hook. When frost is expected, the spring is unhooked and the valve falls upon its seat, and air being admitted through the small pipe which rises above the surface of the water, the pipes can be emptied by simply



turning on the tap at the lowest point in the house service, the water in the cistern being saved.

"To obviate forgetfulness on the part of servants, the inventors have called in electricity to their aid. A thermometer of special construction is so arranged that when the temperature falls below 33° a current is sent through an electro-magnet, which releases a catch, causing the valve to fall upon its seat, and at the same time opening a small pet cock at the lowest point in the house service and draining the pipe. The battery is cut out by the fall of the catch, and when the valve is raised again that water may flow into the pipes, the connection is made good. The electrical part of the apparatus is by no means an *essential* feature, but simply saves trouble, and prevents the possibility of allowing the pipes to remain full during frost, as the contrivance is automatic by its agency."

SUBURBAN SCHOOL HOUSES.

Mr. Warren R. Briggs, an architect of Bridgeport, Conn., who has given much attention to the construction of schools on sanitary principles, has prepared for the State Board of Health of New Hampshire a paper on suburban school houses, a copy of which we have received and have read with interest.

It contains a plan which is in many respects quite original, as will be seen by examining the figures which we reproduce. His proposed school room is for forty-eight pupils, and contains 1,152 square feet of floor space,

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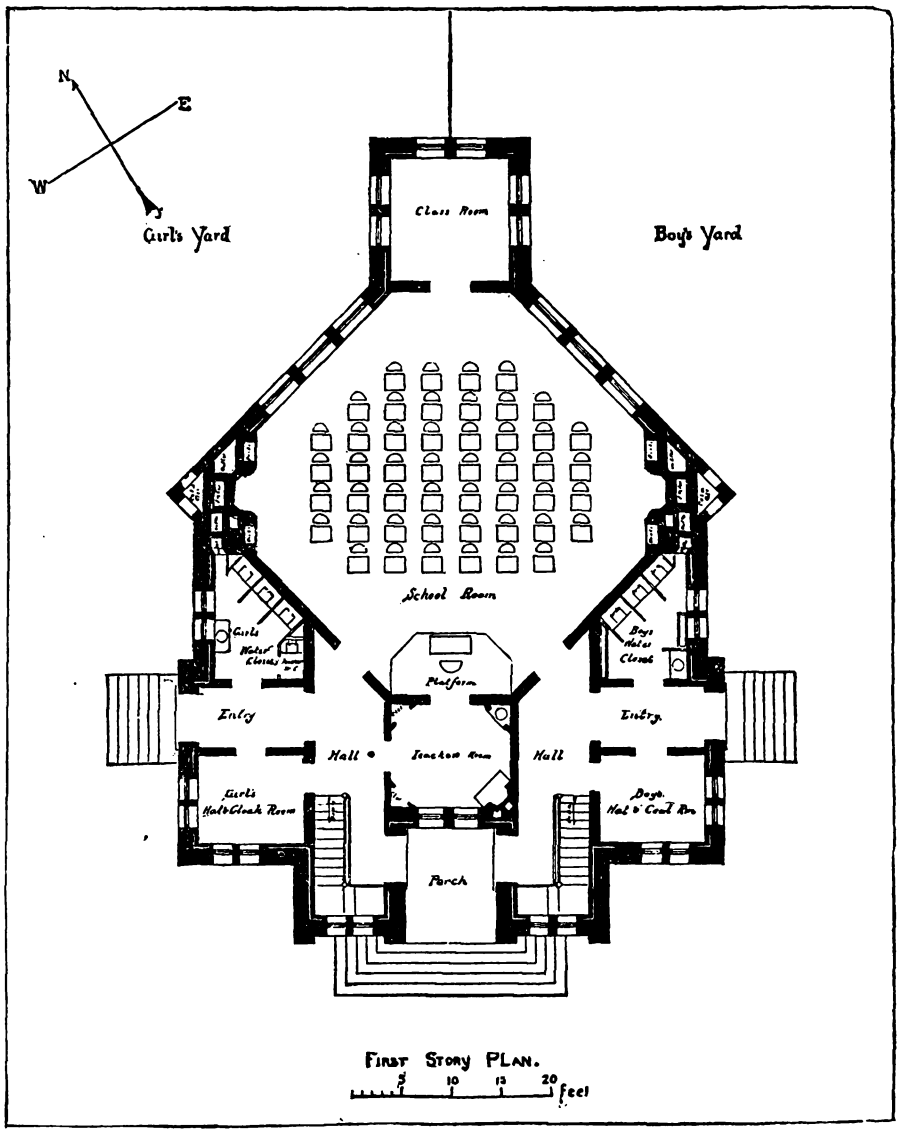
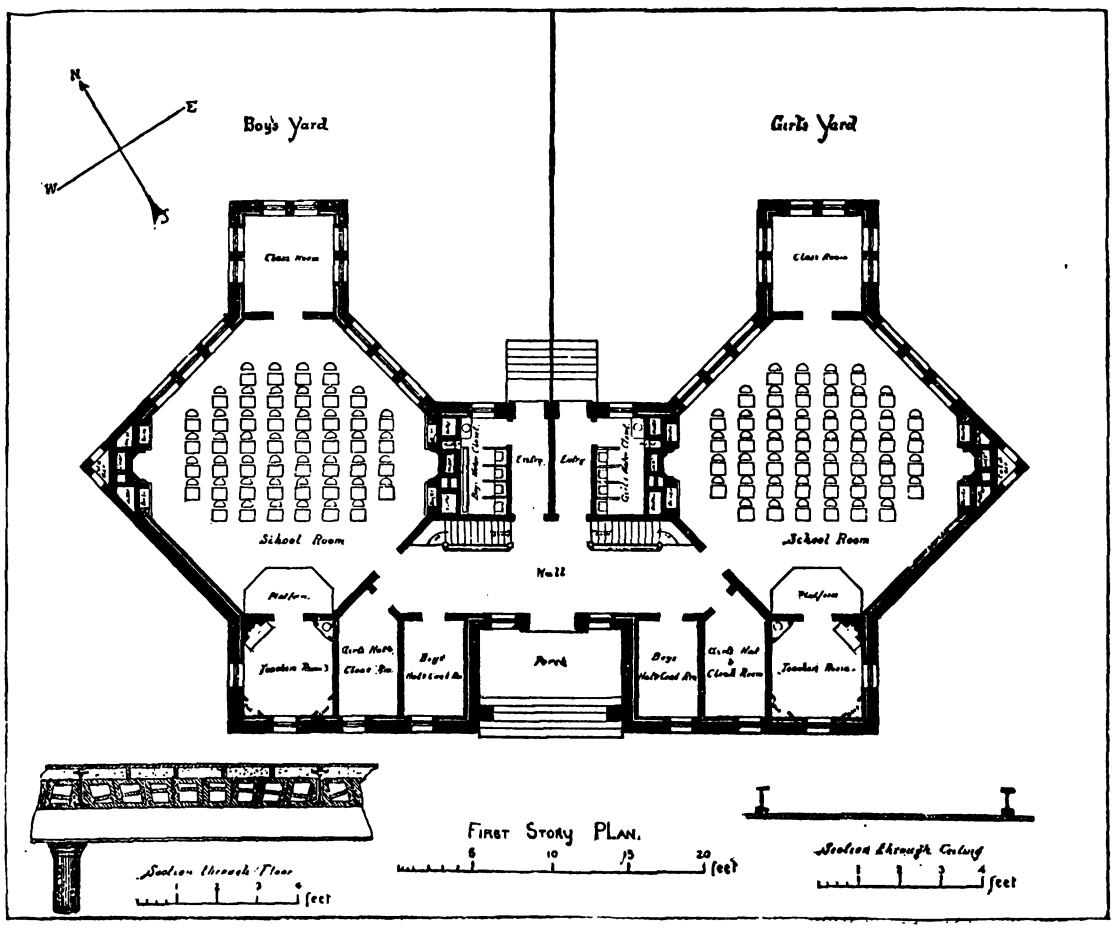
or 23.5 square feet to each person. The windows are all in the rear of the pupils; and the building is to be so placed with reference to the points of the compass that from the windows on the left is obtained a steady north light, and from those on the right the morning sunlight. The height of the school room is 14 feet in the clear, giving an allowance of 347 cubic feet per person. The window sills are four feet from the floor, and the openings run up to within two feet of the ceiling, giving to each person 411¾ square inches of glass surface. The whole space under the school room is to be used as a play room.

It will be seen that he places the water closets in the building on the same floor with and close to the class room. This is contrary to the usual recommendation, but is no doubt preferable to the yard privy as usually arranged, and his location of them is certainly much better than placing them in the basement. He advises the use of simple porcelain hoppers, with tanks overhead, the flow to be produced by mechanism connected with the seat. His plan for the heating and ventilation is essentially that used in the Bridgeport school house, described in THE SANITARY ENGINEER, vol. V., page 4. He allows 30 cubic feet of fresh air per person per minute. We doubt very much the truth of his statement that "the outgoing flues should be at least twice as large as the incoming, no matter how large the latter may be," and predict that if this rule be followed there will either be danger of down draughts or an undue amount of driving power for the exit flue must be provided. His allowance of steam heating surface is 900 square feet for the room, being about one foot of heating surface to every 17½ cubic feet of space to be warmed. This is a large allowance, but not too much under the circumstances. The whole paper shows careful study, and we recommend its careful perusal by all who are interested in this subject.





AN EXPLANATION.

HEALTH DEPT., D. C., *Dec.* 23, 1882.

To the Editor of THE SANITARY ENGINEER:

Referring to the strictures of Mr. Gerhard anent the report of Mr. Robinson, our Inspector of Plumbing, I would say that Mr. Robinson has given the credit due Mr. Gerhard in his report to the Health Officer. The portion giving this credit was probably omitted by inadvertence in the making of copy for your journal. I am satisfied that Mr. Robinson was not knowingly guilty of plagiarism, and I write these few hurried lines to assure you of that fact.

Very truly yours, J. C. MCGINN.
Chief Clerk, Health Dept.

GAS MACHINES.

STAUNTON, VA., *Dec.* 6, 1882.

To the Editor of THE SANITARY ENGINEER:

Will you please answer the following, as it may be of benefit to others:

In this city there is a Springfield Gas Machine rated for 150 burners. There are about 125 burners on it. The generator is about 75 feet from the blower and about 20 feet elevation; temperature at generator about 50° F. in coldest weather: temperature at blower about 65° F. The air pipe runs to outside of house. The main gas pipe is two inches and runs in the ground for 75 feet; then passes through two boiler rooms that are kept heated to about 150°; then passes through a cold room and again in a heated room. There is a party now changing the air pipe from outside of house to this boiler room. I claim this should not be done, for two reasons; first, if there should be a back pressure of gas through this air pipe it would discharge gas in the room and cause a fire; and second, the hot air will have to enter a cold pipe from the blower to the machine and will become as cold as the air outside before it reaches the generator. I told the parties the main gas pipes ought to be changed, so as to be as cool as the generator, and they should not pass through any hot room. I will state that in the summer time this same machine supplies double the quantity of burners, but in the summer there are no heated rooms for the gas to pass through.

By giving me your valuable opinion on the above you will greatly oblige, Yours respectfully,
C. BARGAMIN.

[The air supply should not be taken from the boiler room, but preferably from the outside air. The higher the temperature of the air supply, within existing conditions, the greater will be the amount of hydrocarbon vapor absorbed. If the air which enters the generator has a high temperature it may absorb more vapor than it can retain if subsequently the temperature is greatly reduced. Aside from this we do not think the change of temperature will have any practical effect.]

MOISTURE AND TEMPERATURE.

To the Editor of THE SANITARY ENGINEER:

What will be the effect of running a heating apparatus as regards the effect of the heat with and without evaporation?—in other words, would a room heated to say 60° Fah., dry air, feel warmer to the occupants at same temperature, providing ample moisture was provided from evaporators? I do not know if I have made my meaning plain, but my idea arises from the fact of having noticed, in summer time that on a moist day, or what is called "muggy" weather, the heat is felt more than it is on a dry day with a higher temperature as shown on the thermometer.

J. W. H.

[The presence of moisture in the air has a strong influence on bodily sensations as regards temperature. In an atmosphere nearly saturated with moisture, as in the west and south of England, Ireland or Normandy, 60° F. is sensibly as warm as 75° F. would be in Canada or Minnesota where the air is comparatively dry.

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Were it possible, therefore, to maintain in a room artificially warmed to 60° F. a nearly saturated condition of the air as regards moisture, such a room would be as comfortable as one heated to 70° F., and being nearly free from moisture. But with the external air at the freezing point in this country it is practically impossible to supply the vapor required to maintain such moisture; and it would take more fuel to vaporize the water than it would to heat the room. The only way to effect it would be to have a room absolutely air tight and without ventilation. It would require 5.46 grains of water to each cubic foot of air; 4.02 grains of this must be evaporated by heat, requiring 0.612 units of heat, while the amount of heat required to heat a cubic foot of air from 32° to 68° is 0.635 units or very little more than that required to effect the evaporation.]

REVERSED BLUE PROCESS OF COPYING DRAWINGS.

WORCESTER, MASS., *Dec.* 16, 1882.

To the Editor of THE SANITARY ENGINEER:

I recently bought a "Reversed Blue Process Paper" for copying tracings. I have followed the printed directions, but cannot get good results. The difficulty is in producing a white background. I get it almost clear (except of a light blue tint) in the acid bath; if I brush the paper it fixes in the blue tint. If I let it remain for any length of time it has the same effect. What I wish to know is how can I secure copies of tracings in blue on perfectly white background? An early answer would much oblige,

Yours truly, J. B. W.

[The importer and dealer in prepared paper used in this process guarantees a perfectly white background, if directions are followed; but a gentleman who has been experimenting carefully with it informs us that he has experienced the same trouble you complain of, and has never secured good results with large drawings. A chemist connected with THE SANITARY ENGINEER will experiment with the process and report results.]

THE BOSTON PLUMBING ORDINANCE.

At their meeting, December 21, the Boston Board of Aldermen passed the ordinance regarding plumbing which is printed below. In submitting the report of the Joint Standing Committee recommending its passage, Alderman Pratt explained the attitude of the plumbers of Boston to the ordinance in terms which do great credit to the trade there. He said: "As the preparation of regulations for plumbing requires a knowledge of the technicalities of the art, your committee deemed it advisable to consult with persons of practical experience, and accordingly invited a number of the master plumbers of the city to confer with them on the subject. The committee were gratified at learning that plumbers cordially endorsed the proposition, and were willing to lend their aid in the matter. At the request of your committee a meeting of master plumbers was called, and a committee of their own number appointed to prepare regulations to be submitted to your committee. This was done, and the accompanying ordinance embraces the regulations agreed to by the committee on plumbers. Perhaps the strongest argument in favor of adopting this ordinance is the fact that plumbers are so keenly sensible of the evils that arise from bad workmanship as to voluntarily assist in imposing restrictions upon themselves."

The text of the ordinance is as follows:

Be it ordained by the City Council of the City of Boston, as follows:

SECTION 1. No person shall carry on the business of plumbing who shall not have first registered his name and address in the office of the Inspector of Buildings; and notice of any change in the address of a registered plumber shall be immediately given to said inspector.

SEC. 2. Every plumber shall, before constructing new work or extending or altering old work (except repairing leaks) file at the office of the Inspector of Buildings, upon blanks to be provided for the purpose, a notice of the work to be performed; and no such work shall be done in any building without the approval of said inspector.

SEC. 3. Every house or building shall be separately and independently connected with the public sewer, when such sewer is provided.

SEC. 4. All house drains and soil pipes shall be of iron and shall be securely ironed to walls: provided, however, in cases where it is impracticable to run said pipes on walls, they may be laid in trenches of uniform grade, or suspended to floor timbers by strong iron hangers. All changes in direction must be made with curved pipes and all connections with horizontal pipes, to be made with branches. House drains shall be run at least three feet outside of house walls. At the end of the house drain a running trap shall be placed, with an accessible cleanout on each side. Every house drain shall be provided with a four-inch fresh air inlet on the house side of the trap, with a four-inch pipe extending therefrom to the external air and terminating at a point not less than three feet above the ground, as the Inspector of Buildings may direct. All soil pipes shall be carried out through the roof, undiminished in size, to such height as may be directed by the Inspector of Buildings, provided, however, that no soil pipe shall extend a less distance than two feet above the roof of any building.

SEC. 5. When rain water leaders connect with soil or drain pipes, deep traps shall be placed on said leaders; and in no case shall such leaders be connected outside of the main trap.

SEC. 6. No brick, sheet metal, or earthenware flue shall be used for a sewer, soil or waste pipe ventilator, nor shall any chimney flue be used for such purposes.

SEC. 7. All iron pipes shall be coated inside and out with coal tar pitch, applied hot, or some equivalent substance. All joints shall be run with molten lead and thoroughly caulked and made tight, and no paint nor putty shall be used on said joints. All connection of lead with iron shall be made with brass ferrules, properly soldered and caulked to the iron.

SEC. 8. Every sink, basin, bath-tub, water closet, and each set of trays, together with every fixture having a waste pipe, shall be furnished with a trap which shall be placed as near as practicable to the fixture that it serves. Every trap shall be protected from syphonage or air pressure by a special air pipe of not less than one and one-half inch bore. The air pipe for water closet traps shall be not less than two-inch bore for not more than thirty feet; for more than thirty feet it shall be not less than three-inch bore. All such air pipes shall be not less than four-inch bore where the same pass through the roof. When practicable two or more air pipes may be connected together or with a soil pipe, but in every case such connections shall be above the top fixture; and all air pipes shall be run as direct as practicable.

SEC. 9. All drip or overflow pipes from safes under water closets and other fixtures, or from tanks or cisterns, shall be run to some conspicuous point, and in no case shall any such pipe be connected with a drain, waste pipe or soil pipe.

SEC. 10. No waste pipe from a refrigerator or other receptacle in which provisions are stored shall be connected with a drain, soil pipe or other waste pipe, unless it is provided with a trap, suitably ventilated, and in every case there shall be an open tray between the trap and refrigerator.

SEC. 11. Every water closet, or one line of water closets on the same floor, shall be supplied with water from a special tank or cistern.

SEC 12. No pipes or other fixtures shall be covered or concealed from view in any way until after the work has been examined by the Inspector of Buildings; and said inspector shall be notified by the plumber when the work is sufficiently advanced for inspection.

SEC. 13. All work in new buildings shall be tested by the Inspector of Buildings with the peppermint test, and in case the work does not stand the test, the water shall be turned off from the building and not let on until the plumbing has been pronounced satisfactory by the Inspector of Buildings.

SEC. 14. Whoever violates any provision of this ordinance shall be liable to a penalty of not less than twenty dollars nor more than fifty dollars for each offence.

Reviews of Books.

BOSTON, MASS., SIXTH ANNUAL REPORT OF THE WATER BOARD FOR THE YEAR ENDING APRIL 30, 1882.

This report of 178 pages is full of interesting matter, which would be much more available for reference if there was an index. As it is, any item of information can only be found by turning over page after page.

The Boston Water Works are under the charge of a board of three Commissioners, with the City Engineer as the chief executive officer.

The report of the Board itself is brief and clear. It is a model in its way, setting forth in few words, but explicitly, the condition of the large works under the control of the board, and their recommendations as to the future. The immediate undertaking of the enlargement of the works of supply is urged with force. The Board say: "The steady increase in the consumption of water presents one of the most serious problems which those in charge of the management of water works have to meet."

* * "It has been the practice in the past to provide the funds for increasing the capacity of the works, only when the emergency was most strongly felt by the actual necessities and demands of the consumers. In the opinion of the Board this policy results in great wrong to the consumer. As a general rule the construction of important additions to a water supply includes the loss of several working seasons. This is seldom taken into account, and in consequence, if the works happen to be storage reservoirs, their water has to be hurried into the city, to prevent an actual scarcity of supply, long before it is in a fit condition to be used."

A new storage basin is in course of construction on the Sudbury river, and authority is asked to begin another one. In the meantime, the extravagant use of water must be checked, in order to make the present supply hold out. The Board favor the more extended use of meters, but say, what every sensible person knows to be true, that "there are difficulties in the way of an entire application of the meter system at once, to a city like Boston." In the report of Mr. Wightman, the City Engineer, also, a more extended use of meters is advised in connection with a thorough house to house inspection, and the use of Deacon meters on the mains to ascertain the effect of the inspection in different sections. An interesting report of an application of the Deacon system in Charleston is given by Mr. Dexter Brackett, Assistant Engineer. In this district of 21,760 inhabitants, the daily use of water was reduced from 1,273,000 gallons to 820,000 gallons by the use of the Deacon system of inspection. This result was obtained at an expenditure of $1,511 for meters, and $1,323 for inspection for six and a half months. The cost of the meters being the same for a long time as for a short one, it may be said that an expenditure of about $3,000, per annum effected a daily saving of 450,000 gallons. As this water has to be pumped up to a height of 150 feet and the cost of pumping is $9.66 per each million of gallons delivered into the reservoir, the cost of pumping the amount of water saved, is $1,742 per year, so that in this particular case, it looks at first sight as if it might be cheaper to let the water waste than to stop the waste.

Regarding the application of this system to the city of Boston proper, Mr. Wightman says: "Nearly all the stop-cocks on the service pipes are located on the street roadways, and are inaccessible except by the removal of a portion of the roadway to a depth of a foot or more from the surface. The cost of changing these stop-cocks from the roadways to the sidewalks would cost a large sum, as there are about 40,000 stop-cocks that would have to be changed at an estimated cost of eight dollars each."

This is the great objection to any attempt to check waste in Boston or New York by the Deacon, the Bell, or the Church method of external night inspection, which required the existence of a stop-cock at the sidewalk.

The plan which Mr. Wightman suggests of day house inspection, and checking the result in every section by a Deacon meter on the main, seems practicable and worthy of trial, provided the distribution pipes can be properly districted.

The tables of pipes, meters, metered water, hydrants, taps, etc., are full and satisfactory, except that the superintendent of the Mystic Department does not give the total number of services or taps in use, only noting the additions and changes during the past year.

HOUSE DRAINAGE AND SANITARY PLUMBING.

Mr. William Paul Gerhard's report on the above subject to the State Board of Health of Rhode Island has now been reprinted, with additions in convenient form, by D. Van Nostrand. It is excellently adapted to give the general public an idea of what the details of a good system of plumbing are.

Martin's *Chemists' and Druggists' Bulletin* will hereafter be issued weekly. Its editing is in very competent hands, and it will be of use to the class it aims to serve.

CAUSE OF THE HIGH DEATH-RATE.—"One of the curiosities to be seen at the London Dead-Letter Office is the following, written by a physician: 'This is to certify that I attended Mrs.——in her last illness, and that she died in consequence thereof.—*Ex.*'" We were once shown a death-certificate in the Philadelphia Health-office, in which the physician had evidently filled up the printed blank in a dark room, and had signed his name opposite the "Cause of Death," instead of on the line below.—*Hahnemannian Monthly.*

At the meeting of manufacturers and dealers in proprietary medicines at Rochester, week before last, it was voted to appoint a committee of five to employ legal counsel to prosecute violators of the proprietary rights of members of the association.

A new Eastern District Dispensary and Hospital, Brooklyn, was opened December 18. Mayor Low and others made addresses.

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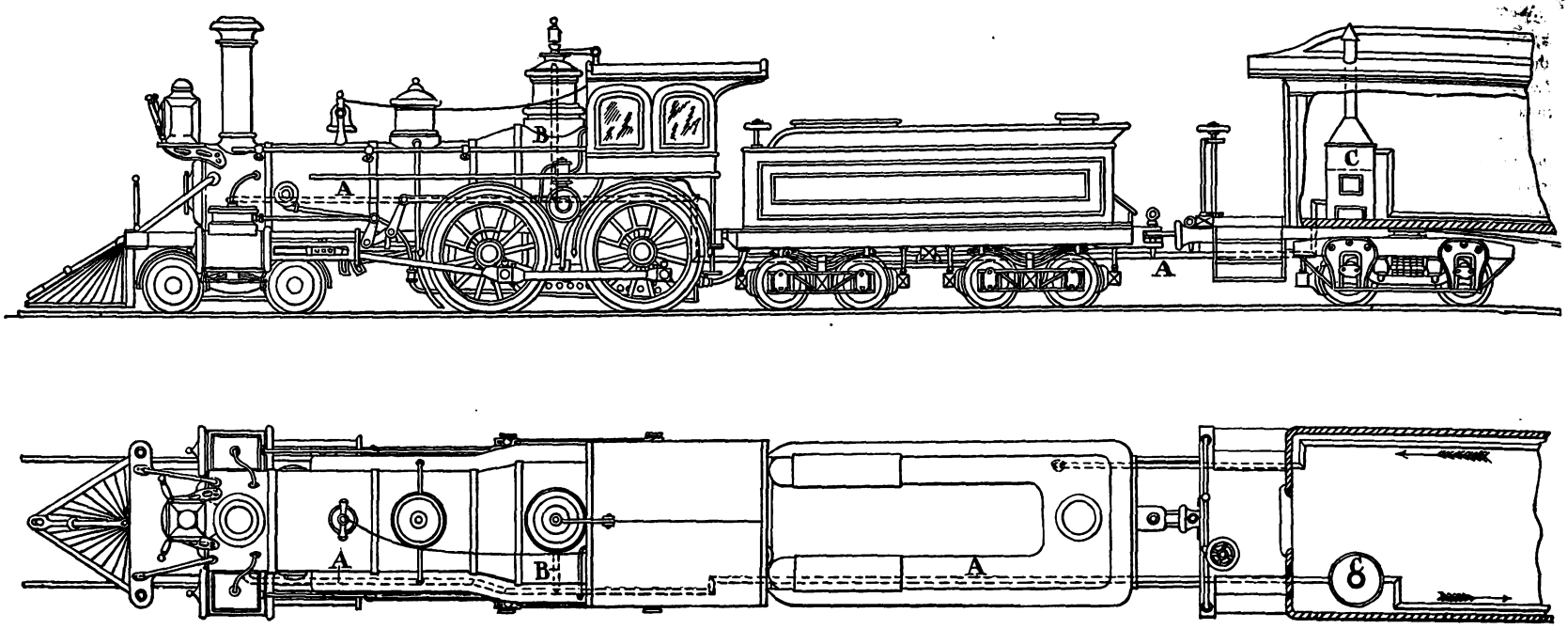

FIGURE 1.—ELEVATION AND PLAN OF GRAYDON SYSTEM OF HEATING CARS BY STEAM FROM THE LOCOMOTIVE.

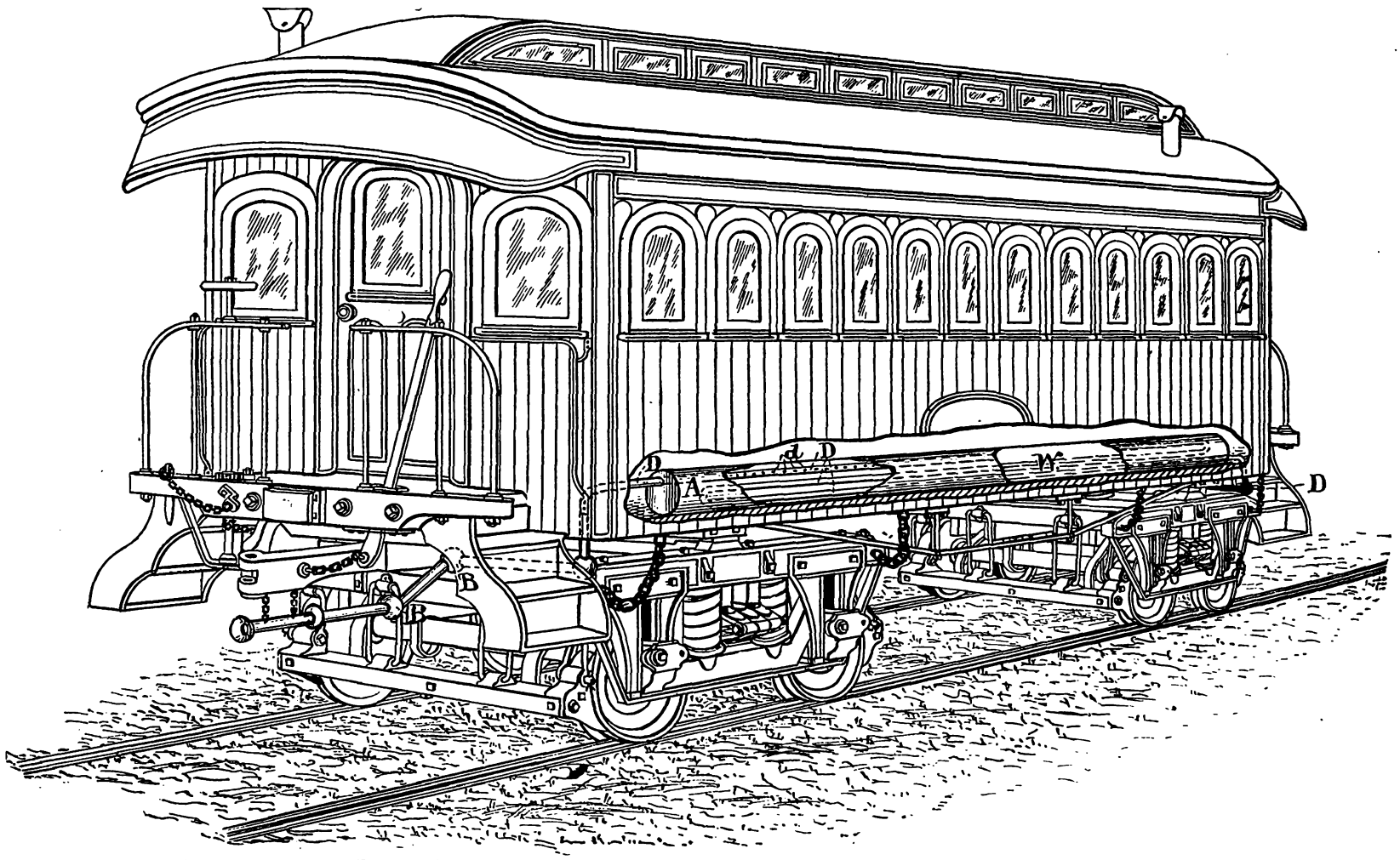

FIGURE 2.—ELEVATION OF CAR, SHOWING HEATING RESERVOIR TO BE CHARGED FROM THE DEPOT GENERATOR.

Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

THE GRAYDON SYSTEM OF HEATING RAILWAY CARS.

Our readers will remember that we have already (Vol. V., pp. 179, 239) described the methods employed on the elevated railroads in this city for heating passenger cars. A system quite different in its details, the invention of Lt. J. W. Graydon, U. S. N., has been tested successfully on the Troy and Boston Railroad, in which the source of heat is either the locomotive or independent steam boilers at the stations.

Fig. 1, illustrating the former, represents an elevation of a locomotive, tender and baggage car, and also a top plan of the same. It is intended to use exhaust steam from the cylinder or from the safety valve, *A* representing the position of the steam pipe in the first case, and *B* in the latter. Our illustration shows a reservoir *C* in the baggage car; smaller reservoirs are placed in each passenger car so that they may remain heated when detached from the train. The reservoir *C* may also be, as shown, a steam boiler, with furnace, complete in itself, in which case the train is heated from the baggage car and not from the locomotive; but the details are, in other respects, the same. While being charged, the reservoir is shut off from the steam pipes by stop valves. When these valves are opened, the pressure in the reservoir decreases, a greater portion of the hot water becomes steam at a lower temperature, which circulates around the train, and this process goes on until the temperature of the hot water is reduced to the boiling point. The steam pipes connecting with the reservoir pass completely around each car, having radiators under the seats, and are provided at each end of the car with stop valves and couplings for connecting with the steam pipes of the next car. They have a suitable incline from the centre to the ends of the car, where "water receivers" collect and discharge the condensation, without interfering with the circulation, stop cocks being placed between the steam pipes and the receivers, and between the receivers and the outer air.

When the train is coupled the stop valves at the ends of each car are closed, except in the rear car, so that connection between the pipes on each side of the cars is interrupted, except through the rear pipe. At the same time the valves on the couplings between the cars are opened, and there results a circulation from the locomotive or baggage car out on one side of the train, through the rear cross pipe, and back on the other side to the water tank of the tender, as shown in the plan above.

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Fig. 2 is a perspective view of a passenger car provided with a reservoir to be charged from a steam generator at the stations. The reservoirs *A*, of which there may be several on each side of the car, though our sketch shows but one, are strong iron cylinders, partly filled with water, as indicated by *W* in the part broken away to the right. The cylinders contain a small pipe *D*, which makes several turns on itself, entering near the bottom, and leaving near the top as shown. The upper portion of this pipe, above the water level, contains a number of small openings, *d*, by which communication is established between the reservoir and the interior of the pipe which makes a complete circuit on one side of the car, the reservoirs on each side having their independent circuits, but being connected by cross pipes under the floor, not shown in the sketch, through which they are charged from the generators.

The operation is as follows: The reservoirs are charged under pressure from the generators at the stations. Circulation then goes on around each side of the car, steam continuing to form until the temperature and pressure have reached the boiling point.

Lieut. Graydon's patent includes many other details. A flexible metallic connection between cars has been designed, which consists of several ball and socket joints together with a screw coupling of peculiar construction. The ball and socket joints are made tight by spring rings, tension screws and packing, which prevent escape of steam, while allowing free play to the joints. A coupling is also devised which is intended to couple automatically when two cars come together, the shock at the same time opening valves for the circulation of steam through the pipes. When cars are to be detached the steam pipes uncouple automatically, and the valves close by the pressure of the steam.

Construction Notes.

We shall always be glad to receive items of interest for this column.

CHICAGO.—In response to the city's re-advertisement for furnishing hydrant and stop valve castings, the following bids were put in, the first named being awarded the contract December 20; John H. Bass, $47. a ton; Union Foundry & Pullman Car Wheel Works Co., $47.50; Marshall & Miller, $48.50; Jno. Featherstone, $55.

HAVERHILL, MASS.—The contract for rebuilding portion of wrought iron bridge over the Merrimac River has been awarded to the Boston Bridge Company for $10,450. The King's Bridge Company of Ohio submitted a bid at $11,964.

HYDE PARK, ILL.—At the second meeting of the Board of Trustees, Dec. 4, the following bids for furnishing water pipe were opened. Dennis, Long & Co., 1400 feet of six-inch cast iron water pipe at $40 per ton of 2000 pounds; A. H. McNeal, 1400 feet of six-inch cast iron water pipe at $42 per ton of 2000 pounds; Cincinnati and Newport Pipe Co., 1400 feet of six-inch cast iron water pipe at $38 per ton of 2000 pounds. The contract was awarded to the Cincinnati and Newport Iron and Pipe Co. The contract for laying the pipe was awarded to Michael Philbin at 34 cents per lineal foot.

PHILADELPHIA.—An ordinance authorizing the Mayor to enter into a contract for lighting Chestnut street with the electric light for $10.000, was on the 12th inst., referred to a sub-committee of the Council Committee on Gas.

—The Council Committee on survey have reported favorably on the construction of a three-foot sewer on Mountain street.

—F. T. Walton, better known as "Plunger" Walton, of New York City, has offered to clean the streets of Philadelphia for $500,000 per year, providing that the city will give him a contract for five years. He will expend $200,000 in machinery, to perform the work properly, and will deposit $100,000 as a guarantee fund to be drawn on by the controller to pay for the doing of such work as he does not do according to contract.

CHICACO.—The following bids for hydrants and stop valve catchings were opened the 7th inst.: J. H. Barr, $49.50 per ton; Union Foundry & Pullman Car Wheel Co, $50; Clark, Raffen & Co., $54.

James H. Roche was awarded the contract for laying water service pipes in Rush Street, from Ohio to Erie Streets.

SOUTH NORWALK, CT.—Proposals for the construction of an iron swing bridge over the Norwalk River at South Norwalk, Ct., will be received by W. H. Earle, Chairman of the Bridge Committee, until January 11.

TOLEDO, O.—The following is a synopsis of bids received for rolled iron beams, for first story floor for custom house, etc., at Toledo, Ohio:

1.	M. Clements	$3,714 22
2.	The Smith Bridge Co.	3,749 61
3.	McHose & Lyon	3,917 00
4.	Snead & Co. Iron Works	4,120 36
5.	Haugh, Ketcham & Co.	4,306 02
6.	Russell Iron Works	3,820 36

The bid of M. Clements has been accepted.

GREENFIELD, MASS.—The matter of increasing the water supply was brought before a public meeting, Dec. 5, at which the report of the committee was considered. They, "after making a thorough study of the whole question and examining the various sources of supply and the matter of enlarging the Glen reservoir, unanimously recommend this plan: Raise the dam at the Glen six feet, involving an expense of about $4,000; build a reservoir on Rocky mountain, east of the village, which would be 168 feet above the arch on Main street; run a pipe from the Glen water pipe to this reservoir, which could be filled during the night, and used for fire and mechanical purposes. By this plan the total expense, including the raising of the dam, would be about $34,000." —*Springfield Republican.*

CINCINNATI.—The Committee of the Board of Councilmen will recommend that the contract for removal of garbage, dead animals, and animal and slaughter house refuse, be awarded for ten years to the Fertilizing Company, for $12,500 per annum, to be paid by the city.

BROOKLYN.—The contract for the Brooklyn Navy Yard sewer has finally been awarded to Charles Hart for $97,800. The lowest bid, that of Michael Tobin ($65,550) was rejected and the contract then awarded in turn to the next two higher bidders, John Brady ($79,500) and Friel & McNamee ($88,125), both of whom failed to qualify.

BOSTON, MASS.—Referring to the dispute over the bids for plumbing materials for the Boston, Mass., Sub-Treasury and Post Office, opened by Thos. Brown, Supt., the Treasury Department has determined to adhere *to the terms of its advertisement* and has awarded the contract for plumbing materials to Messrs. Dalton and Ingersoll, at their bid of $10.095.34, nothwithstanding a bid was filed by Messrs. Phillips and Weeden of $9,924.36, after the hour for closing the bids—12 M.

In the matter of fire-proof shutters for the C. H. and P. O., Cincinnati, Ohio (list of bids reported Dec. 15, 1882) department states that it will require some two or three weeks to manufacture the shutters, and prepare to make the test of same, and until such action is taken, no award will be made.

PADUCAH, KY.—The contract for plastering the Court House and Post Office, will be awarded to Jas. Eastman, at $2,450.00.

RAPPAHANNOCK RIVER Bids were opened Dec. 21, for dredging in Rappahannock River, Va., Urbana Creek Va., and St. Jerome Creek, Va., as follows:

	Rappahannock River.	*St. Jerome Creek*	*Urbarna Creek*	*Total*
Dan'l Constantine.	$21,000.00	Cut A & B $6,318.00	$3,750.00	$31,068.00
Potomac Dredge Co.	19,860.00	Cut A & B 12,639.00	6,222.22	38,721.22
Mack Bowen.	23,875.00	No bid	6,875.00...	.....
Henry Birch.....	21,000.00	No bid	6,750.00	.....
Geo. E. Ward.....	26,000.00	Cut A & B 6,572.28	6,500,00	39,072.28

Dan'l Constantine being the lowest on all work, is awarded the contract.

ROCHESTER, N. Y.—The contract for the wrought iron bridge on Lyell avenue was awarded Dec. 22 to the Hudson River Works, Hudson, N. Y., at $10,990.

NEW YORK.—The day for opening the street cleaning bids has been postponed from the 26th to the 30th inst., in consequence of an injunction granted by Judge Van Brunt restraining Street Commissioner Coleman from awarding contracts.

In consequence of charges made against them, the Board of Health of Cincinnati have demanded an investigation by the Board of Councilmen.

A factory has been opened at New Orleans to make illuminating and lubricating oil out of cotton seed *Memp. Appeal.*

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Nos. 33 and 35 Jefferson st, one b warehouse; cost $23,000; o, Crampton Bros; a, Frank Holmberg; b not selected....17th st, n s, 281 w Second av, b and st apartment house; cost $195,000; o, a and b, Thos. Osborne....153 and 155 w 54th st, one b stable; cost $30,000; o, Wm. P. Baldwin; a, Geo. P. Pelham ...150, 152 and 154 w 58th st, three b dwells; cost ea $30,000; o, John Coan; a, Thom & Wilson....First av w s, 25 s, 73d st, three br st tens; cost ea $15,000; o, Jacob L. Maschke; a, John C. Burne....72d st, n s, 150 w Av A, five br st flats; ea $16,000; o, Chas Sedgwick; a, Chas Baxter; b, M. J. Daly ....Riverdale-on-the-Hudson, nr Mt. St. Vincent Station, st and fr dwell; cost $25,000; o, Robert A. Johnston; a, Wm Schickel; b, J. & G. Stewart and F. S. Quick....157 w 54th st, b stable; cost $12,000; o and a, Geo. B. Pelham.

ALTERATIONS, NEW YORK CITY.

Third av, s e cor 111th st, four houses; cost $5,500; o, G. Wallace Bryant; a, And. Spence....15 and 17 Elizabeth st, cost $2,500; o, M. Schrenkeisen; b, Von Dolson & Arnott....307 Canal st, cost $7,436; o, Richard Arnold et al; a, Wm Schickel: b, Frank Lynn, Jr., and Edward Smith....Broadway, n w cor 11th st, cost $6,000; o, Methodist Book Concern; a, D. & J. Jardine... 6 e 54th st, b extension; cost $2,000; o, Caroline G. Reed; a, Wm Shears; b, E. A. Shears.

BROOKLYN.

Stanhope st, s w cor Central av, fr ten; cost $5,000; o, Peter Schlich; b, J. Rueger ...McDonough st n s, abt 100 e Marcey av, three br st dwells; cost $5,200; o, James How; a and b, Jos. Platt; m, J. Demott & Son....Lexington av, s s, 72 e Nostrand av, br st ten; cost $6,750; o, W. J. Northridge; a and b, R. Van Brunt ...148 Norman av, n w s 25 s w Newell st, fr ten; cost $6,000; o and b, L. Antonius; a, Th. Englehardt....Floyd st, s s, 250 w Lewis av, two fr stores and dwells; cost ea $4,000; o and m, John Straub... Jefferson st, n s, 395 e Tomkkins av, six b dwells; cost ea $6,000; o, Hannah E. Stoutenburg; a, H. E. Fickett & Co; b, Geo B. Stoutenburg....s 2d st, n s, 100 e 7th st, three b dwell; cost ea $5,000; o and R. B. Ferguson; a. E. F. Gaylor....325 s 5th st n e s, 80 s e 9th st, br st ten; cost $7,000; o and b Geo Lehrian; a, Th Englehardt....Clifton pl s s, 260 e Nostrand av, three br st dwells; cost $4,500; o and b, A. Miller; a, T. Miller.... Nevins st, w s, bet Sackett and Degraw sts, b engine house; cost $8,000; o, the Fulton Municipal Gas Co; a, John F. Harrison; b, Richard Deeves... Bushwick av, e s, bet Vanderveer and Hull sts, frame hotel; cost $6,000; o, Jos Boyer; a, John Platte; b, C. Brown and N McCormack.

BOSTON, MASS.—Newbury st nr Fair st, four br dwell, o and b, Oscar L. Stillings....Columbus av, 239, br dwell, o, Geo, Wheatland; b, Vinal Dodge....Marlboro st, 2:6, br dwell, o, C. E. Hubbard; b, Vinal Dodge... Cortes st, 17, br dwell, o, Richard and John Holmes; b, Holmes Bros. . Shawmut av, 63, br mercantile build, o, Poland Worthington, b, Rumsey & Co....Washington st, cor Keyes st. br boiler house; o and b, M. Denman Rose....Newburgh st, 99 and 101, br dwel, o, Chas. E. Lauriat....West Newton st, 12 br dwell; o and b Ivory Bean

BRIDGEPORT, CONN.—Lafayette st, fr block five houses, cost $12,000 o, Chas. Hawley; a, Skaats; b, C. Jessup....Lafayette st, fr; dw, cost $8,000; o, a and b. J. Day... Middle st, br block, cost $10,000; o, Judson; b, S. Hurlbut....Park av, four houses, cost $10,000; o and b, C. Purdy.

CHICAGO, ILL.—3,617 Ellis av, br dwel; cost $5,000; o, C. O. Gleason; b, C. O. Gleason....166 Schiller st, br flats; cost $5,000; o, Sophia Wixtrom; a, F. H. Wadspier; b, A. M. Mansson....133 Lincoln av; br dwel; cost $5,000; o, F. A. Williams; a, Wm. N. Arend; b, Chas. Hellman....143 S. Hoyne st, br flats; cost $7,000; o, Miss E. S. Merrimon; a, Rock & Rogers; b, Rock & Rogers....N. E. cor. Laflin and Monroe sts; 1 br and b st dwel; cost $15,000; o, Mrs. Agnes Irons; a, Burnham & Root....535 Washington boulevard; br and b st dwel; cost $14,000; o, Dr. E. Warrington Earle; a, M. Jennison....Cor Erie and Western av; 2 br dwel; cost $10.000; o, O. M. Brady; a, M. Edbrooke....617 N Clark st, br store and flats; cost $8,500; o, M. J. Swatch; a, Theo. Karls; m, P. Ebertshauser & Bros; c, M. Bender

CINCINNATI, O.—14 and 16 Fulton av, br; cost $5,000; o, M. McKiernan & Son; b, M, McKiernan & Son....87 Richmond st, br; cost $5,000; o. A. E. Muth; b: A. E. Muth....Cor Oak and Buckeye st; 3 br; cost $15,000; o, Anthony Zimmermann; b, E. Schilling 603 Elm st, br, cost $2,500; o, John Sauer; b, Louis Fay....McMillan nr May st, br; cost $7,000; o, Wm. Riefer; b, Rice & McMiller.

CLINTON, IOWA.—M. Jackson, County Farm nr Andrew, Iowa; br dwel; cost $1,000; o, Jackson Co; a, W. W. Sanborn; b, not let.... On Cedar Co. Farm nr Tipton, Iowa, plumbing of Co. Insane asylum; cost $80,000; o, Cedar Co. Iowa; a, W. W. Sanborn; b, Hendall & Co.

MONTGOMERY, ALA.—Market st, government build, cost $140,000; c, Tigh & Williams....Commerce st, br stores, cost $60,000; m, Tigh & Williams; c, Thomas & Gorel.

PHILADELPHIA, PA.—521 Cherry st, br warehouse; b, W. C. McPherson....York e of Front st, br factory; b, Eldridge & Stewart....Main st e of Shurs Lane; br factory; o, R. H. Patton.... 553 N Second st; dwel, etc.; o, W. H. Rhinehard....Mt Vernon e of Broad st, br church chapel; b, H. C. Ambler.

ST. LOUIS, MO.—6th, bet Biddle and O'Fallen st, br warehouse, cost $2,500; o, J. H. Spinning; a, J. B. Legg; c, L. M. Manning.... Tunney, bet Grand and Vandeventer av, br dw, cost $5,200; o, C. E. Rabideaux; c, Barnes & Doly....3d, bet Pine and Olive, office build, cost $5,000; o, Mitchell & Co; a, G. J. Barnet; c, J. Rude ....Pine, bet Cardinal & Compton; dw, o, Dr. J. F. Stedman; c, Z. T. Knott.

MISCELLANEOUS.

ESCOOBBA, MICH.—Br high school; cost $26,000; a, G. P. Randal; b, Snow & Alsop.

FERGUS FALLS, MINN.—Br school b'ld'g; cost $25,000; a, G. P. Randall.

KANSAS CITY, MO.—Broadway, addition, br block, cost $25,000; o, F. S. Stewart.

LAKE CROSS, WIS.—Dwel; cost $30,000; a, G. P. Randall.

MARINET, MICH.—Store and b'ld'g; cost $28,000; a, G. P. Randall; b, Snow & Alcox.

ST. PAUL, MINN.—Br high school b'ld'g; cost $85,000; a, G. P. Roodall

WHEELING, VA.—Labelle Nail Mill, additional iron superstructure, cost $10,000.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING DECEMBER 16, 1882.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland.....Maine	34,390	9	13.6			1							1			1		1						
Boston.....Mass	399,446	186	24.3	55	30.0	7		33	5	2	19	1	1		2	13		9						
Cambridge.....Mass	56,566	18	16.6	7	38.9			1	3		5					1				1				
Worcester.....Mass	63,776	16	13.1	6	37.5		1	5		1														
*New Haven.....Conn																		1		2			1	
Providence.....R. I	111,987	43	20.0	12	27.9			4	2		4		9		1	4								
Total	666,165	272	21.8	80	29.4	8	1	43	10	3	28	1	11		3	19		11		3			1	
EASTERN CITIES.																								
Albany.....New York	97,035	82	44.0	37	45.1	1		7	7	2			7		1	13	1	8		16	1			
New York.....New York	1,282,349	598	24.3	199	33.3	20	3	103	14	18	17	4	3	11	16	80		29		8	5		3	
Brooklyn.....New York	624,776	272	22.7	101	37.1	9		29	7	5	14		4	5	13	39	2	22	1		3		2	
Hudson Co.....New Jersey	222,675	84	19.6	35	41.7	2	4	14	9		6			2		14		5			4		1	
Newark.....New Jersey	145,701	58	20.7	16	27.6	1	2	11			2		1	1	3						1			
*Camden.....New Jersey																								
Philadelphia.....Pa.	896,157	370	21.5	128	34.6	7		59	15		35		9	3	4	37	2	10		1		5		
*Reading.....Pa.																1								
Wilmington.....Delaware	46,087	15	16.9	3	20.0			1	1				1											
Total	3,314,780	1,479	23.2	519	35.1	40	9	224	53	25	74	4	25	22	37	184	5	74	1	28	14	5	6	
LAKE CITIES.																								
Buffalo.....New York	166,235	67	21.0	28	41.8	4	1	8		2	4	1	3		11	6	1				1			
Rochester.....New York	91,616	26	14.8	7	27.0	1	1	2			7			1		1	1						1	
Syracuse.....New York	54,168	13	12.5	5	38.4	1		4										1						
*Cleveland.....Ohio																								
Detroit.....Michigan	128,431	55	22.3	21	38.2			4	2		11	1			5	3		3			5	5		
Chicago.....Illinois	580,625	221	19.0	100	47.1	7		24	2	1	14	1	7	1	6	9	1	13	1		1			
Milwaukee.....Wisconsin	131,661	49	19.4	23	46.9	1		4	4	1	2		1		2	5		3						
Total	1,152,736	422	19.1	184	43.6	14	2	46	8	4	38	3	11	2	24	24	3	20	1		7	5	1	
RIVER CITIES.																								
*Allegheny.....Pa.																								
Pittsburgh.....Pa	185,135	64	18.0	23	36.0	5		4	2	3	6		7		1	4		2			1	2	1	
Cincinnati.....Ohio	265,471	112	22.0	41	36.6	3		12	2		3	1	10		3	11	4	3			1		3	
Dayton.....Ohio	41,108	12	15.2	4	33.3	2		1						1			1							
Louisville.....Ky.	130,116	58	23.3	11	19.0	3		9					4	2		9		1				2	1	
*Indianapolis.....Indiana																								
Terre Haute.....Indiana	29,660	8	14.0	4	50.0			1	2							1								
Minneapolis.....Minn	88,728	21	12.8	5	23.8			3	1		2		1			6					1	2		
St. Paul.....Minn	51,463	21	21.2	12	57.1	2	4	1	1	1	5					1		2						
St. Louis.....Mo.	360,580	179	25.8	78	43.6	6	2	16	8	4	16		3	3	7		22	14			1		2	
Total	1,152,261	475	21.5	178	37.5	21	6	47	16	8	32	1	25	6	11	32	27	22			4	6	7	
PACIFIC CITIES.																								
San Francisco.....Cal....(Dec. 9)	263,713	122	24.1	27	21.1	4	1	22	1	1	5		4			13	1	7			2			
Total																								
SOUTHERN CITIES.																								
District of Columbia.. Wh.	134,042	46	17.9	14	30.4	3		6	1		3			1	3	4	1			1				
" " Col.	69,663	31	23.2	17	54.8			6		1					1	4	1	2			1			
Richmond, Va. Wh.	38,024	9	12.3	2	22.2				1				1			2								
" Col.	29,110	22	39.4	6	27.3	1		5	1							1								
Charleston, S. C. Wh.	22,699	9	20.8	3	33.3			2	1				1	1				1						
" Col.	27,537	11	20.8	4	36.3			5		1						2								
Atlanta, Ga. Wh.	24,764	9	18.9	2	22.2			2			1		1											
" Col.	18,695	5	13.9	2	40.0		1										1							
*Savannah, Ga. Wh.																								
" Col.																								
Nashville, Tenn. Wh.	31,086	14	23.4	3	21.4				1							2	1					2		
" Col.	18,848	14	38.7	14	42.8			2	2							2								
Memphis, Tenn. Wh.	18,677	13	36.2	3	23.1			1		2	1					2		1						
" Col.	14,896	9	31.5	8	88.3	2	1	1																
*Mobile, Ala. Wh.																								
" Col.																								
New Orleans, La. Wh.	162,777	88	28.2	18	20.5	3		15		8	2		1	4	2	7		2				5		
" " Col.	59,457	38	33.3	6	15.8	1		3		2			1	2		2		1				4	1	
Total White	432,069	188	22.7	45	23.9	6		26	4	10	7		4	6	5	17	2	3		1		7		
Total Colored	238,203	130	28.4	44	33.8	4	2	22	3	4			1	2	1	11	2	4			1	4	1	
Total in 34 U. S. Cities	7,219,930	3,088	22.3	1,077	34.7	97	21	430	95	55	184	9	81	38	81	300	40	141	2	32	28	27	16	
Dec. 2—Total in 28 English Cities	8,469,571	3,615	22.8			141				35	22		85		111					115		10	49	
" " " 8 Scotch "	1,206,057	581	24.8			21				16	19		12		12					8			21	
" " " 16 Irish "	843,553	476	29.3			6				12	2		4		16					10		1	7	

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Notes and Abstracts.

During the week ending December 16 the annual mortality rate in 34 United States cities (San Francisco return of previous week included) having an aggregate population of 7,219,930, was 22.3 per 1,000, identical with the rate reported from the large cities of England for the week ending December 2. The unusual prevalence of diphtheria in this country is inferred from a comparison of the deaths caused by it with the number registered in England. On the other hand the mortality from measles is greater in England.

Boston, Philadelphia, St Louis, Detroit and St. Paul record a large mortality from diphtheria.

In proportion to population, Buffalo gives the largest number of deaths from scarlet fever.

One-half of the 32 deaths from measles reported from the 34 cities occurred in Albany, N. Y.

The mortality from small-pox has risen considerably during the week, 27 deaths having taken place as against eight during the previous week. Deaths from this disease were reported from Philadelphia and Pittsburgh, Pa., Chicago, Ill., Louisville, Ky., Nashville, Tenn., New Orleans, La., and Minneapolis, Minn.

ATLANTA, GA.—Dr. James B. Baird reports a case of small-pox, the contagion having been imported from Chattanooga, Tenn.

NEW ORLEANS, LA.—The report for the week ending December 9 did not arrive in time for last week's issue. Total deaths, 131; white 84, colored 47; under five years 31, white 21, colored 10. Accidents caused eight deaths, small-pox four, typhoid fever four, malarial fevers 10, consumption 17, croup one, pneumonia nine, diarrhœa nine, dysentery six and puerperal convulsions one death.

FULTON, ILL.—Dr. G. W. Clendenen reports the city in good sanitary condition.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin's report shows four admissions, 12 discharges, two deaths and 1,339 remaining under treatment.

LOUISVILLE, KY.—Dr. E. R. Montgomery reports 12 cases of small-pox, all of which were sent to hospital, except one isolated at house and the house flagged.

DETROIT, MICH.—Dr. O. W. Wight reports 20 cases of scarlet fever and 34 of diphtheria.

BOSTON, MASS.—C. E. Davis, Jr., City Clerk, reports 44 cases of diphtheria, 22 of scarlet fever, and seven of typhoid.

NANTUCKET, MASS.—J. T. Burr, Clerk, reports a case of small-pox.

MINNEAPOLIS, MINN.—Dr. J. C. Cockburn, Health Officer, reports under date of 16th inst., that there are 18 cases of small-pox in the city.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 12 new cases of scarlet fever, and nine of diphtheria, which with those carried over from last week, make 38 of scarlet fever and 13 of diphtheria remaining under treatment.

PITTSBURGH, PA.—Dr. Snively reports one new case of small-pox during the week.

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HUDSON CO., N. J.—The report for the week ending December 9 was not received in time for our table in last issue. Eighty-four deaths were recorded, of which number 51 were under five years of age. Accidents caused two deaths, consumption 14, croup nine, diphtheria six, cerebro-spinal fever four, intermittent fever two, measles three, whooping cough one, bronchitis five and pneumonia 13 deaths.

MICHIGAN.—Dr. Henry B. Baker, Secretary State Board of Health, reports the prevailing diseases in the State during the week ending December 9 as follows: neuralgia, rheumatism, bronchitis, intermittent fever, tonsilitis, consumption, remittent fever and pneumonia. Intermittents, influenza, tonsilitis and pneumonia extended their area. Diphtheria and scarlet fever were reported present at 16 places, and measles at four places. Small-pox was not reported from any locality in Michigan.

PORT OF NEW YORK.—The report of Dr. Hanor, National Board of Health Immigrant Inspector, shows the arrival of 6,640 immigrants during the week ending December 9. Of this number 179 were vaccinated at quarantine.

DETROIT, MICH.—Dr. Mulheran, Immigrant Inspector, reports 749 arrivals during the week ending December 9. Of these 90 were vaccinated at the station.

PORT HURON, MICH.—Dr. H. R. Mills reports for the week ending December 9 the arrival of 755 immigrants, of whom 517 required vaccination.

BALTIMORE, MD.—Jas. A. Stewart reports the arrival of 858 immigrants during the two weeks ending December 15. Only three required vaccination.

ONTARIO, CANADA.—The Bulletin issued by the Provincial Board of Health shows the following diseases as prevailing during the week ending Dec. 9.: bronchitis, neuralgia, influenza, diphtheria, tonsilitis, anæmia, and consumption.

SANTIAGO DE CUBA.—The consular report for the month of Nov. shows 123 deaths, of which 42 were caused by yellow fever. The 42 deaths occurred among 51 cases of the disease. The harbor and its vicinity is reported as being free from infection.

PERNAMBUCO, BRAZIL.—Consul H. L. Atherton reports six deaths from small-pox during the week ending Nov. 5. Pulmonary complaints are reported prevalent, and many cases of titanus are said to have occurred.

RIO DE JANEIRO, BRAZIL.—Consul General Jas. H. Murray reports 253 deaths for the week ending Nov. 18; of these 61 were caused by small-pox, seven by pernicious fever, and 41 by consumption.

BUENOS AYRES, ARGENTINE REPUBLIC.—Consul E. L. Baker reports for the month of September 35 deaths from small-pox, four from diphtheria, and two from scarlet fever. The city is reported as in bad sanitary conditions and fears are entertained of a large increase in the death rate in view of the approach of warm weather.

VALPARAISO, CHILE.—Vice Consul August Möller, Jr., sends report for Oct., showing 561 deaths in a population of 100,000. Small-pox caused 26 deaths during the month.

ENGLAND.—Cousul General E. A. Merritt sends the return of the Registrar-General for the week ending December 2. The death rate was lowest in Bolton, 14.7; highest in Newcastle-upon-Tyne, 28.6; average rate in 28 towns, 22.3; rate in London, 21.5 per 1,000. Small-pox caused five deaths in London, four in Newcastle-upon-Tyne, and one in Nottingham.

SCOTLAND.—Consul J. A. Leonard transmits report of Registrar-General, week ending December 2. Death rate in the eight principal towns, 24.8; lowest in Greenock, 14,8; highest in Perth, 29 3 per 1,000.

IRELAND.—The Registrar-General's return for the week ending November 25 was received too late for tabulation in our last number. There were 472 deaths in the 16 city districts, giving a rate of 29.1 per 1,000, No deaths from small-pox were registered. Measles caused 12 deaths, scarlet fever 16, typhus fever five, whooping cough 12, diphtheria one, enteric fever nine, consumption 40, and diseases of the respiratory system 127.

The return for the week ending December 2 shows 476 deaths in the 16 urban districts, and the occurrence of a fatal case of small-pox in Londonderry.

DUBLIN, IRELAND.—The report of Dr. Chas. A. Cameron, for the four weeks ending October 28 shows 582 deaths, giving a ratio of 21.7 per 1,000 persons living. The deaths from zymotic diseases fell off considerably as compared with the previous month. There were 40 deaths from diarrhœal diseases in September, and only eight in October. Typhus declined from seven to five, and there were no deaths during October from diphtheria, scarlet fever, or measles. Whooping cough, however, increased from six to 11.

ROTTERDAM, NETHERLANDS.—Consul John F. Winter reports, for the week ending December 2, the occurrence of three deaths from small-pox, and two from measles. The latter disease is said to be prevalent.

AMSTERDAM, NETHERLANDS.—Consul D. Eckstein reports 189 deaths during the week ending November 25, in a population of 342,000. No deaths from small-pox were registered.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 86 deaths for the week ending Nov. 18. Of these two were caused by bronchitis, ten by pneumonia, 17 by consumption, one by measles, seven by scarlet fever, six by diphtheria and three by typhoid. Annual rate 25.6 per 1,000.

COPENHAGEN, DENMARK.—Consul H. B. Ryder sends reports for the weeks ending Nov. 14 and 21. During the former there were 108 deaths, of which one was caused by measles, five by scarlet fever, one by croup, two by whooping cough, five by diarrhœa and one each by puerperal fever and erysipelas. No cases of small-pox were recorded but there were 13 cases of measles, 21 scarlet fever, ten diphtheria, one croup, 21 whooping cough, 15 typhoid fever, 99 diarrhœa, 16 erysipelas, two puerperal fever. During the latter week there were also 108 deaths, two of which were caused by measles, two by croup, three by whooping cough, two by typhoid fever, two by diarrhœa and one by erysipelas. Cases reported as follows: measles, 20; scarlet fever, 58; diphtheria, 9; croup, two, whooping cough, 50; typhoid, 15, diarrhœa, 99; erysipelas, 24. Bronchial catarrhs, tonsilitis and gonorrhœa are the prevailing diseases, there having been recorded of these 374, 140 and 128 cases.

BRUSSELS, BELGIUM.—During the week ending Nov. 25, the deaths in the city and its faubourgs numbered 166, of which 70 were under five years of age. No deaths occurred from measles, scarlet fever, whooping cough, diphtheria or small-pox; croup caused three deaths typhoid fever two, diarrhœa 26, acute lung diseases, 24 and consumption 25 deaths.

RHEIMS, FRANCE.—Consul John L. Frisbie reports 36 deaths for the week ending Nov. 27. No deaths were registered from small-pox, typhoid fever, scarlet fever or whooping cough. Measles caused one death and croup two deaths. Mr. Frisbie says that owing to the scarcity of work for the laboring classes, about 2,000 of whom are now out of employment, much destitution prevails, and fears have been entertained of an increase in the death rate by reason of exposure and privation, but happily as yet these have not been realized.

VENICE, ITALY.—The bulletin for the week ending Nov. 25 shows the occurrence of 68 deaths, equal to an annual rate of 26.4 per 1,000 living. The birth rate for the week was only 25.4. No deaths from small-pox, measles or scarlet fever. Croup caused one death, typhoid fever one, diarrhœal diseases ten, consumption ten and acute lung diseases ten deaths.

ST. PETERSBURG, RUSSIA.—Consul Gen. Edgar Stanton reports 568 deaths during the week ending Nov. 18. Of these 244 were under five years of age. Small-pox caused 21 deaths. Population 927,467.

SMYRNA, TURKEY.—Consul W. E. Stevens reports on November 24 that the small-pox epidemic in Smyrna and its environs has increased and become more virulent. The hospitals are filled with cases of the disease and there is no immediate prospect of improvement. Not even approximate figures of the deaths from the disease can be given, as no mortuary or sanitary statistics are kept by the authorities and none of any value are procurable from other sources. No precautions are taken to prevent the spread of the contagion. Even the ghastly practice of conveying dead bodies through the streets with the coffin lid removed and the corpse exposed to full view, held aloft on the shoulders of the bearers, is persisted in. Vaccination is general among European residents, but at this time there is a want of good vaccine matter. Efforts have been made by the physicians to persuade the authorities of the province to provide vaccine matter for the poor, they offering to apply it gratuitously, but the reply is that there is no money in the treasury.

MADRAS, BRITISH INDIA.—Consular Agent L. Strange reports 238 deaths during the week ending November 10, equal to a rate of 31.1 per 1,000. Small-pox caused five deaths; fevers 58; dysentery 17, and diarrhœa 12. No deaths from cholera are reported.

CALCUTTA, BRITISH INDIA.—Consul General H. Mattson reports for the week ending November 4 the occurrence of 256 deaths, of which 37 were caused by cholera, 77 by fevers, 26 by bowel complaints, 14 by tetanus. Annual rate 30.8 as compared with 33.6 during the previous week. Cholera is reported as sporadic but somewhat over average in prevalence.

PENANG, INDIA.—During the month of September 90 deaths occurred from fever, 23 from small-pox and two from cholera. The authorities are alive to the danger from cholera and have adopted all measures of precaution in doubtful or suspicious cases. The natives do not look favorably on vaccination, as they believe it to be productive of attacks of the disease which it is intended to prevent. The practice of inoculation gave rise to this idea.

THE INSPECTOR AND THE HOUSE OWNER.

One of our exchanges, published at a famous health resort near this city, prints a dialogue between a house owner and a health inspector which is too good to be buried in the waste paper basket. Mr. House Owner is inclined to object to the visit of the Health Inspector who finds a wooden privy vault on his premises, in violation of the local ordinance. "Confound your ordinance and Board of Health and Commissioners!" he says, "Why won't you let me alone? The town is getting to be a little too clean a place to suit me. I'm ready to sell out. You restrict my liberties entirely too much. I must make a water tight privy vault; throw no kitchen slops on the ground; keep my children away from day school and Sunday school for a month or two if they happen to have the measles or scarlet fever, etc. Yes, I'm ready to sell out."

H. I., "All right; I'll venture to say you will find a purchaser at once; for of course you will sell for cost."

"H. O., "Oh, no! my lot is worth four times the price I paid for it six years ago."

H. I., "Then the rules you object to have not depreciated the value of your property? Perhaps on reconsideration you may take a different view of the matter, and conclude that wise sanitary precautions are not injurious after all, but on the other hand they are essential to the prosperity of a health resort. People who visit us come here and *improve* their surroundings, and they will certainly pass us by unless everything relating to hygiene and sanitation is an improvement upon that which they are accustomed to at home. Cesspools and privy vaults of the leaking pattern will hardly satisfy the requirements of the modern health seeker; besides, you are altogether out of fashion, as only eleven other wooden vaults still exist in the borough. Good day. I'll be round again soon."

Tables showing the number of new patients at six New York City dispensaries for the week ending Dec. 9, 1882, with some of the principal acute diseases.

Name of Dispensary and Reporter.	Character of Disease.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Total.
New York Dispensary, Reported by Dr. Wm. A. Valentine.	Acute Diseases.	38	26	33	21	10	21	149
	Chronic Dis'es & Surg. Cases.	37	40	35	42	29	20	203
Demilt Dispensary, Reported by Dr. E. J. Dalken.	Acute Diseases.	14	21	21	19	17	15	107
	Chronic Dis'es & Surg. Cases.	45	51	50	46	30	35	257
Bureau Med. Relief, Dpt Char. and Corrections. Reported by Henry Savage.	Acute Diseases.	49	35	41	39	38	33	234
	Chronic Dis'es & Surg. Cases.	37	35	52	53	47	34	258
Northern Dispensary, Reported by W. B. Sinn	Acute Diseases.	22	15	34	13	17	6	107
	Chronic Dis'es & Surg. Cases.	10	9	16	12	9	9	65
Eastern Dispensary, Reported by Dr. S. S. Bogert.	Acute Diseases.	17	11	12	15	12	10	91
	Chronic Dis'es & Surg. Cases.	37	36	32	50	20	23	168
North Eastern Dispensary, Reported by Dr. W. Schoonover.	Acute Diseases.	44	40	42	40	9	35	210
	Chronic Dis'es & Surg. Cases.	16	20	32	18	22	12	120
Total.....	Acute Diseases.	184	148	183	147	103	120	898
	Chronic Dis'es & Surg. Cases.	182	191	217	221	157	133	1071

Name of Dispensary.	Total New Patients.	Under 5 Years.	Males.	Females.	Whooping Cough.	Malarial Fever.	Diarrhœal Diseases.	Acute Lung Diseases.	Brain Diseases.
New York Dispensary	352	61	135	156	1	9	2	84	1
Demilt Dispensary.....	364	41	174	190	5	16	6	60	....
Bureau of Med. Relief, Dept. Charities & Corr'c'n	492	66	266	226	6	48	11	126	16
Northern Dispensary.....	172	15	90	82	1	4	3	34	....
Eastern Dispensary	310	64	125	185	3	6	4	61	2
North Eastern Dispensary	330	58	120	210	...	12	8	78	2
Total.....	2320	305	910	1049	16	95	34	443	21

These tables show that during the week 898 cases of acute diseases received attention, and that of these nearly one-half were cases of acute lung disease. One case of diphtheria, eight of measles and one of typhoid fever are reported. The proportion of cases reported as malarial fever continues high.

Dr. Edward Sargeant, Medical Officer of Health for Bolton, in his report on the health of that borough for the year 1881, states that there were registered during the year 3,811 births and 2,022 deaths. The population, in census of 1881, amounted to 105,414. Infectious diseases had a limited prevalence, giving rise to 469 reported cases, of which 61 proved fatal. The high death rate from the zymotic diseases reported is most probably due to the fact that not unfrequently a medical man is not called in until the case proves severe or complications arise. The mild cases treated without medical aid are not reported. He states that his experience is that the desire for concealment is rare, and he knows of no instance where medical advice has been delayed from fear of notification to the sanitary authority. In his examination of articles under the sale of the Food and Drugs Act he found adulteration in 28 per cent. of the samples submitted, most of these were in cases of milk.

The farmer's convention at Rockville, Ct., week before last directed some attention to the ventilation of stables. Dr. G. A. Bowen, of Woodstock, made a strong plea for the better ventilation of farm buildings, particularly of barns. Some of the old-fashioned barns may have had too much ventilation for comfort, but the other extreme is reached when warmth is furnished at the expense of air. Cattle that constantly inhale the deleterious odors of the manure heap suffer ultimately in health and lose their vigor. He would have no cellars under house or barn, unless lighted and ventilated by windows. In the discussion following, Prof. Brewer, of New Haven, claimed that a double shaft was the only proper way to ventilate a close stable. With a furnace in a cellar, one flue will answer. No stable is perfect without dry earth as a deodorizer.

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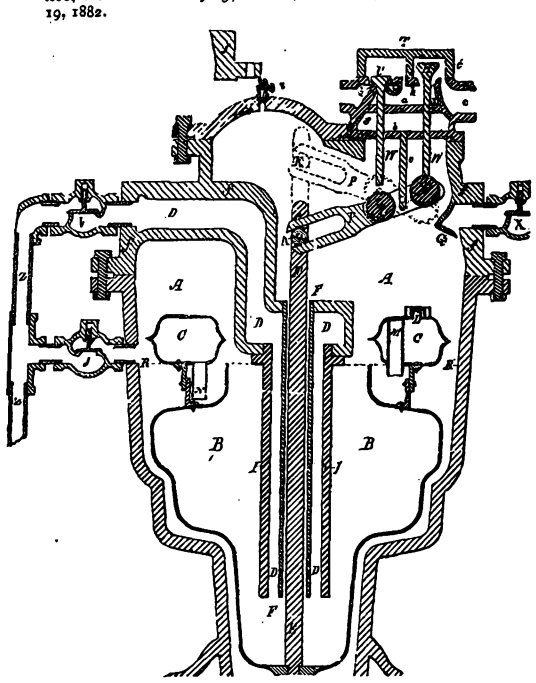
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

264,522. STEAM-TRAP. BARRENT W. FELTHOUSEN, Milwaukee, Wis. Filed May 23, 1882. (No model.) Issued September 19, 1882.



Claim.—1. A steam-trap provided with a movable tank attached to the float, arranged and constructed so as to alternately receive and discharge water, and by its consequent change of weight render the movements of the float more positive, for the purpose already described.

2. A steam-trap provided with a movable tank connected to the float furnished with an inlet and outlet pipe and a valve at the top, substantially as and for the purposes set forth.

3. A steam-trap provided with a tank attached to an open-top vertical float.

4. A steam-trap provided with a steam and relief valve, with a partition in the cover that separates the two valves, substantially as described.

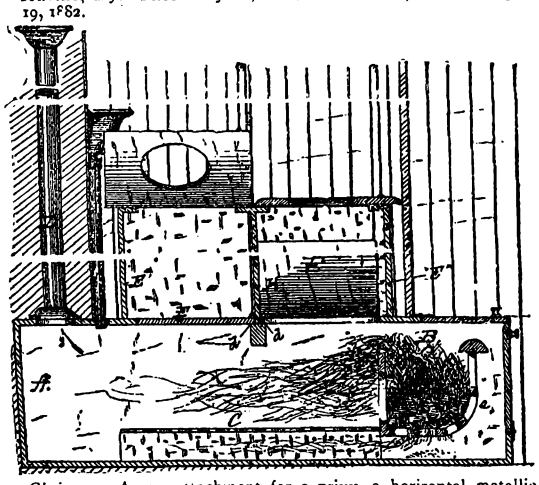
5. The combination in a steam-trap, of the lever P, bevelled rollers O O, float B, and valve-spindles adapted to be rotated whenever they are opened, substantially as and for the purposes set forth.

6. In combination with a steam-trap, an inwardly-opening check-valve, J, situated in the discharge-pipe below the discharge check-valve V, and leading into the body of the trap above the line R R, substantially as and for the purposes set forth.

7. In a steam-trap, the combination of the rod E, attached to float B, and provided with roller K and lever P, forked for the reception of the roller, so as to prevent all lost motion, substantially as and for the purposes set forth.

8. In a steam trap, the combination of the steam-valve H, relief-valve U, the check-valves X and V, float B, tank C, rod E, guide-pipe and passage D, all constructed and arranged substantially as and for the purposes set forth.

264,568. FURNACE FOR PRIVIES. WILLIAM S. ROSS, Madisonville, Ky. Filed May 11, 1882. (No model.) Issued Sept. 19, 1882.



Claim.—1. As an attachment for a privy, a horizontal metallic casing constituting the depository for the fecal matter, and provided with the hinged lids and fire chamber, substantially as set forth.

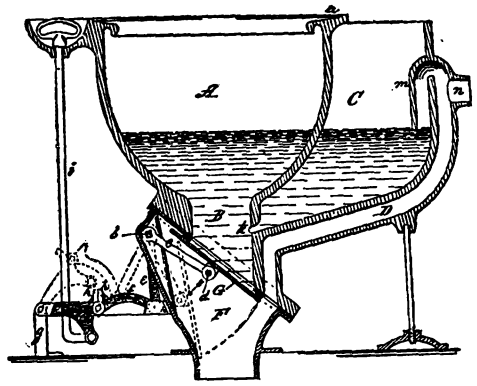
2. The attachment for a privy, consisting of the horizontal metallic casing with the perforated false bottom C, bridge-wall *b*, and grate bars *a*, arranged in about the same horizontal plane with the hinged lids E, and doors communicating with the grate surface, substantially as set forth.

3. The combination, substantially as hereinbefore set forth, of the horizontal casing A with the perforated false bottom C, grate-bars *a*, bridge-wall *b*, hinged lids E, the metallic frame E[1], privy box with hinged seats, and the connecting means.

4. A privy box having its front lined with metal and formed with a support, *e*, for the lid of the deposit chamber, in combination, with the deposit chamber of a furnace, substantially as set forth.

264,693. WATER CLOSET. JAMES HAY and ROBERT H. LECKY, Allegheny, Pa. Filed Jan. 10, 1882. (No model.) Issued Sept. 19, 1882.

Claim.—1. In a water closet of the described class, a bowl, A, having a neck, B, depending vertically from the centre of the bottom thereof with its lower edge inclined, in combination with a swinging valve, C, adapted to close against said inclined lower edge, substantially as described.



2. In a water closet provided with a flooding cistern and having a valve closing against the lower edge of the neck and opening downwardly and away to one side of the neck or trunk, an opening *k*, into the neck from the cistern at a point above and opposite the valve, substantially as described, whereby a jet in flooding impinges directly upon said valve and cleanses the same.

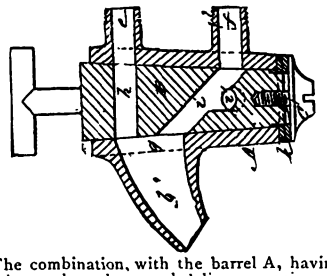
3. The combination with the valve and the pull-rod, of two interposed toggles, *f f*[1], having the locking abutments *h*, substantially as described.

4. The combination with the neck B, valve G, and rod *i*, of the interposed toggles *f f*[1], having abutments *h*, the arms *c*, shaft *b*, and cranks *e*, substantially as described.

5. In a water closet, the bowl A, having central vertical neck B, cistern C, overflow pipe D, trap *m*, and air vent *n*, all in one integral piece, substantially as described.

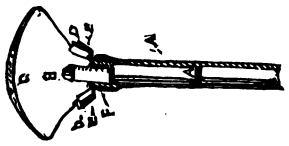
6. In a water closet, the bowl A, having formed integral therewith the pull socket E, substantially as described.

264,573. FAUCET. JOHN H. SEABURY, Hempstead, N. Y. Filed July 22, 1882. (No model.) Issued Sept. 19, 1882.



Claim.—The combination, with the barrel A, having a taper seat and elongated or enlarged general delivery opening, *g*, the nozzle *b*, and cold and hot water inlets *e f*, of the taper rotating plug B, provided with an upper through transverse passage, *h*, and with duplicate oblique intersecting through passages, *i i*[1], substantially as and for the purposes herein described.

263,881. GAS AND LAMP BURNER. ELIAS B. REQUA, Jersey City, N. J. Filed July 15, 1882. (No model.) Issued Aug. 29, 1882.



Claim.—The combination, with a burner for gas or oil, of a perforated platinum ribbon located over the burner, substantially as described.

2. The combination, with a burner for gas or oil, of a perforated platinum strip or ribbon extented over the burner, and a deflector for deflecting the upwardly-induced currents of air into the flame for heating the platinum strip or ribbon, substantially as described.

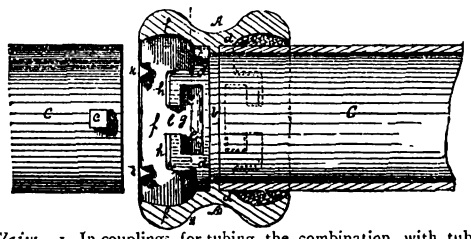
3. The combination, with a burner for gas or oil, of a platinum strip or ribbon extended traversely over the burner in the plane of the flame issuing therefrom, and of a bowed or similar shape which approximates the contour or form of the flame, substantially as and for the purposes described.

4. The combination, with the burner, of the platinum strip located over the same, the deflector for deflecting upwardly-induced air-currents into the flame, the perforated base, and a glass flame protector I, substantially as described.

5. The combination, with a burner for gas or oil, of a platinum strip or ribbon extended transversely over the burner in the plane of the flame issuing therefrom, and non-conducting supports for sustaining the ends of the platinum strip or ribbon, substantially as and for the purposes described.

6. The combination, with a burner, of the slotted deflector G, the perforated base H, and the platinum strip located over the burner, and having its ends secured in the glass tubes D, which are held in sockets supported from the burner, substantially as described.

263,863. COUPLING FOR TUBING. EDMUND C. CONVERSE, Pittsburgh, Pa. Filed June 12, 1882. (No model.) Issued Sept. 5, 1882.



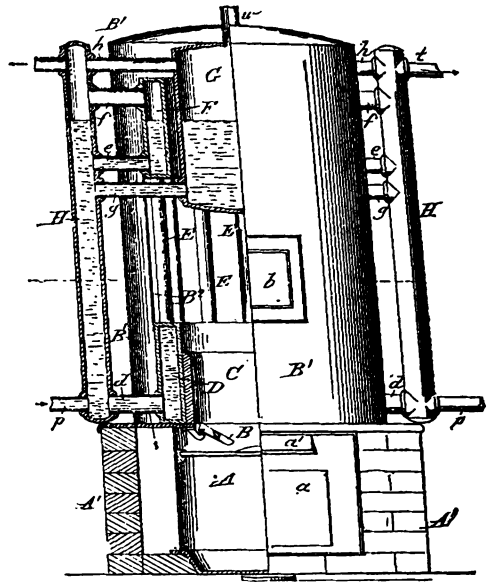
Claim.—1. In couplings for tubing, the combination, with tubing having one or more lugs or other connecting devices at or near each end thereof, of a coupling collar or sleeve provided on the interior with a central ring, corresponding locking seat or seats on each side of said ring for the reception of the lugs on the tubing, and annular calking recesses between such locking seats and the ends of the collar substantially as and for the purposes set forth.

2. In couplings for tubing, a coupling collar or sleeve provided on the interior with a central ring, an annular calking recess at each end for the reception of calking material, and a series of wings extending across the mouth of each annular recess, where the wings are substantially triangular in shape, to permit the calking of the material underneath said wings, as and for the purposes set forth.

264,801. UTILIZATION OF BY-PRODUCTS IN THE MANUFACTURE OF COAL GAS. ROGER W. WALLACE and CARL F. CLAUS, London, England, assignors of two-tenths to William Freeman Jack and Ebenezer Stewart, same place; said Wallace assignor of his remaining right to said Claus. Filed July 25, 1882. (No specimens.) Patented in England, Jan. 20, 1877, No. 273. Issued Sept. 19, 1882.

Claim.—1. The process of purifying gas by separating ammonia from the ammoniacal liquor, consisting of treating the said liquor with chloride of sodium and carbonic acid, as specified, and then separating the chloride of ammonium from the solution, and finally decomposing the chloride of ammonium by lime, thereby reproducing pure ammoniacal gas.

264,835. HEATING APPARATUS. JONATHAN JOHNSON, Lowell, Mass. Filed Mar. 3, 1882. (Mo model.) Issued Sept. 19, 1882.



Claim.—1. The combination, in a hot water or steam heater, of an annular water chamber, provided with vertical connecting pipes, a central interior case or water chamber exposed to the direct action of the products of combustion, vertical water pipes exterior to the furnace case, and lateral tubes connecting the exterior pipe with the lower annulus and with the upper water chambers, said lateral tubes being arranged to connect with said upper chambers, respectively, at a point near the top and a point near the bottom thereof, whereby the chambers are constantly supplied with water, substantially as set forth.

2. The combination of the lower casing A[1], upper concentric shells or casings, B[1] B[2], lower annular water chamber D, arranged within the inner casing and adapted to serve as a fire-pot, upper annular water chamber F, vertical pipes E, connecting said annular chambers inner water chamber, G, vertical pipes, H, exterior to the furnace and connected with the inner water chambers by means of lateral pipes, and the flue I, communicating with the lower part of the furnace below the level of the fire-pot, whereby all the chambers are constantly supplied with water and the products of combustion are carried up over the inner faces of said chambers and downward over their outer faces, substantially as set forth.

3. In a heating apparatus, the combination of the lower annular water chamber, D, upper annular chamber, F, vertical pipes E E, connecting said chambers, central water chamber, G, supported at the upper part of the apparatus, vertical water columns H H, exterior to the furnace shell, and provided with inlets *p p* and exits *t t*, the horizontal pipes *d*, connecting the water columns with the lower annulus, and other horizontal pipes, respectively, connecting said columns with the upper annulus and with the central chamber both at a point near the top and a point near the bottom thereof, substantially as set forth.

4. In a heating apparatus, the combination of the lower shell or casing, A[1], plate A[2], supported thereon, and having draft openings *b*[1] *b*[1], upper concentric furnace shells, B[1] and B[2], annular water chambers D and F, connected by vertical pipes E E, central water chamber, G, vertical water columns H H, connected by lateral pipes with the inner water chambers, and the smoke pipe I, communicating with the lower part of the furnace below the level of the fire-pot, substantially as set forth.

5. In a heating apparatus, the combination, with the inner water chambers, D, F and G, and exterior water columns H H, having inlets *p p* and exits *t t*, of the steam separating radiator K M, having perforated plates M[1], eduction pipes O, and return pipe N, substantially as set forth.

264,899. SUPPORT FOR ELECTRIC LIGHTS AND CONDUCTORS. GEORGE H. ALLEN, Boston, Mass. Filed May 16, 1882. (No model). Issued Sept. 19, 1882.

264,642. ELECTRIC DISTRIBUTION AND TRANSLATION SYSTEM. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Aug. 9, 1880. (No model.) Patented in England Sept. 24, 1880, No. 3,880; in Canada Nov. 15, 1880, No. 11,997; in Italy Nov. 19, 1880; in Belgium Nov. 30, 1880, No. 53,018; in France Jan. 3, 1881, No. 139,588; in Victoria Jan. 4, 1881, No. 2,944; in Austria Feb. 3, 1881; in New South Wales March 7, 1881; in New Zealand March 7, 1881, No. 512; in Queensland March 9, 1881; in Spain April 2, 1881, and in India July 20, 1880, No. 528. Issued September 19, 1882.

264,643. MAGNETO-ELECTRIC MACHINE. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed May 12, 1879. Patented in Belgium June 16, 1879, No. 48,341; in England June 17, 1879, No. 2,402; in Italy June 23, 1879; in Victoria Aug. 16, 1879, No. 2,685; in France Aug. 25, 1879, No. 130,910; in Sweden Sept. 24, 1879; in Spain Oct. 4, 1879; in Norway Jan. 20, 1880; in Austria-Hungary Jan. 22, 1880; in Denmark June 11, 1880, and in Germany Feb. 7, 1881, No. 12,033. Issued Sept. 19, 1882.

264,646. DYNAMO OR MAGNETO ELECTRIC MACHINE. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Nov. 28, 1881. Renewed Aug. 14, 1882. (No model.) Issued Sept. 19, 1882.

264,647. DYNAMO OR MAGNETO ELECTRIC MACHINE. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Oct. 4, 1881. (No model.) Issued Sept. 19, 1882.

264,648. DYNAMO OR MAGNETO ELECTRIC MACHINE. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Nov. 11, 1881. (No model.) Issued Sept. 19, 1882.

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"The able bodied sewer gas," as a correspondent has termed it, which has roamed at will in the Chicago jail has been investigated by a committee containing several architects. It would appear that they were deeply impressed with the odors, and will recommend radical changes in the ventilation. This has brought the Chicago *Tribune* to its defence with the claim that the ventilation and the plumbing are of the best, and smells were only noticed because the ventilating fan was not running since it entailed extra labor on the engineer. If this be so the management and not the odors would appear to need looking after.

The village of East Chester is going to oppose, to the best of its ability, Mt. Vernon's effort to discharge sewage into Hutchinson river. At a meeting of citizens last week a committee was appointed to collect funds to secure counsel to oppose the bill which Mt. Vernon will seek to have passed by the State Legislature. A petition will also be drawn up and sent to the State Board of Health asking them to oppose the construction of the proposed sewer.

"Experience teaches us," says the Hartford Steam Boiler and Inspection Company, "that nine-tenths of the boiler explosions in the country are attributable to carelessness on the part of engineers, or to the cupidity and avarice of the owners, who, to save the expense of additional boiler power, will order their boilers to be run at excessive and dangerous pressures."

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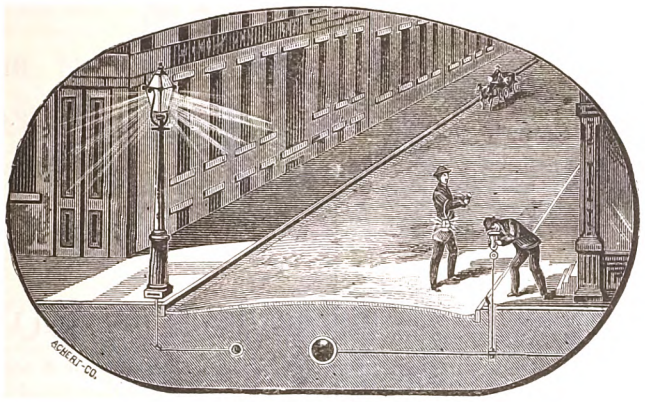

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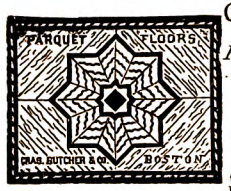

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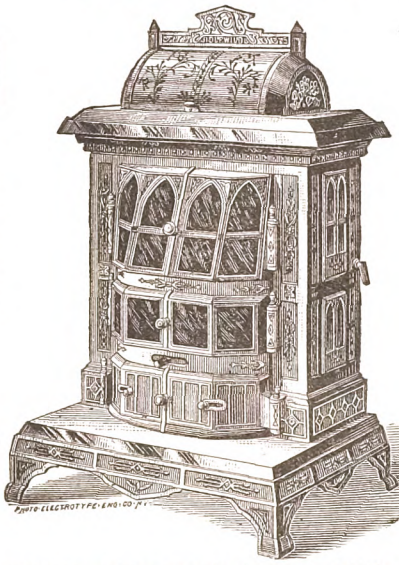

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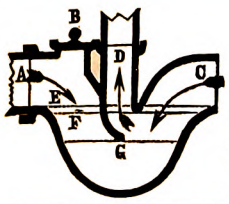

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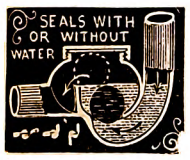

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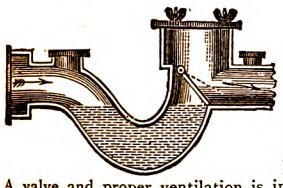

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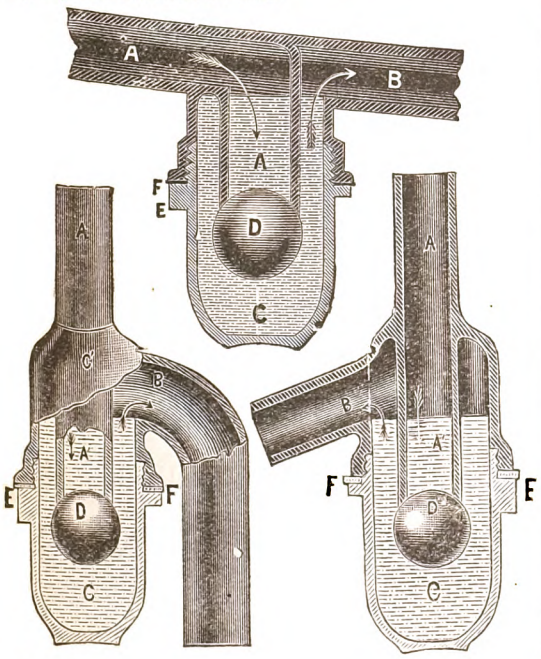

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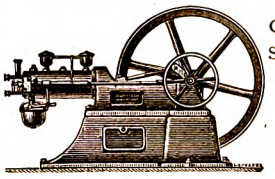

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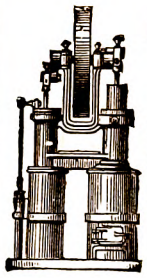

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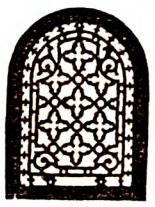

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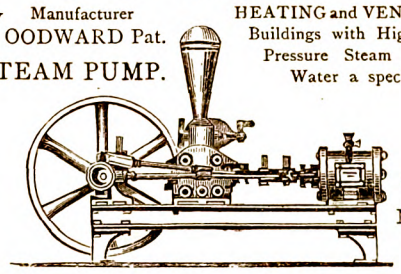

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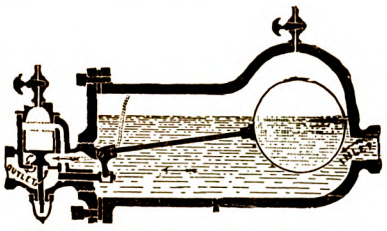

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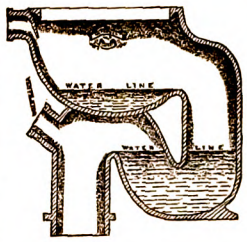

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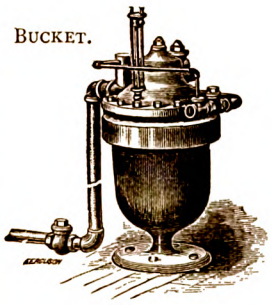

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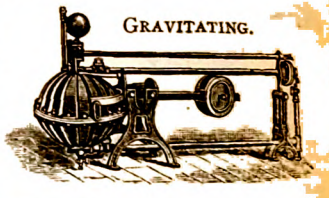

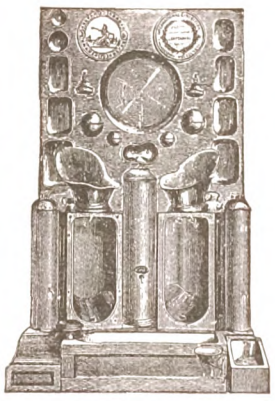

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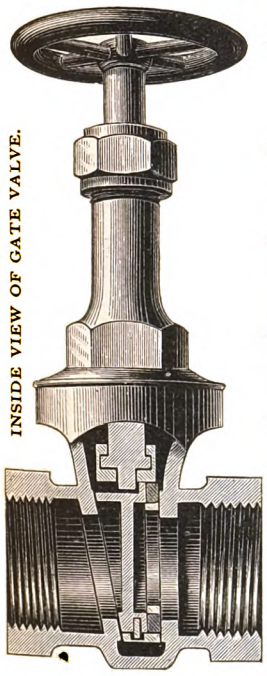

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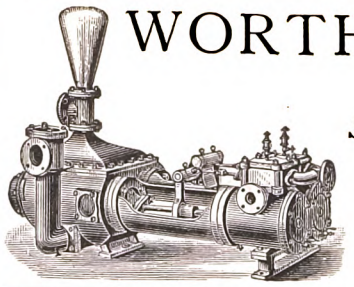

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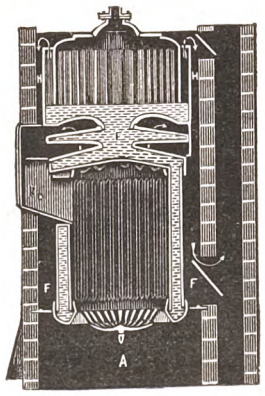

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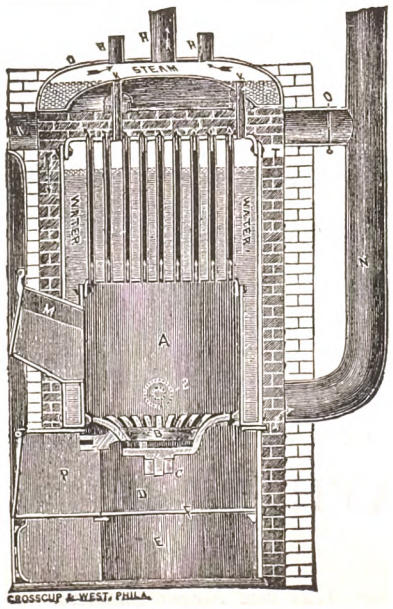

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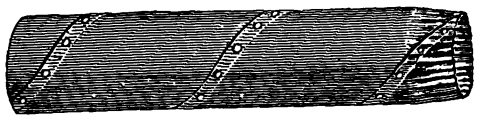

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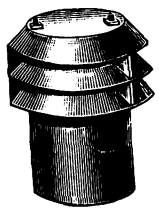

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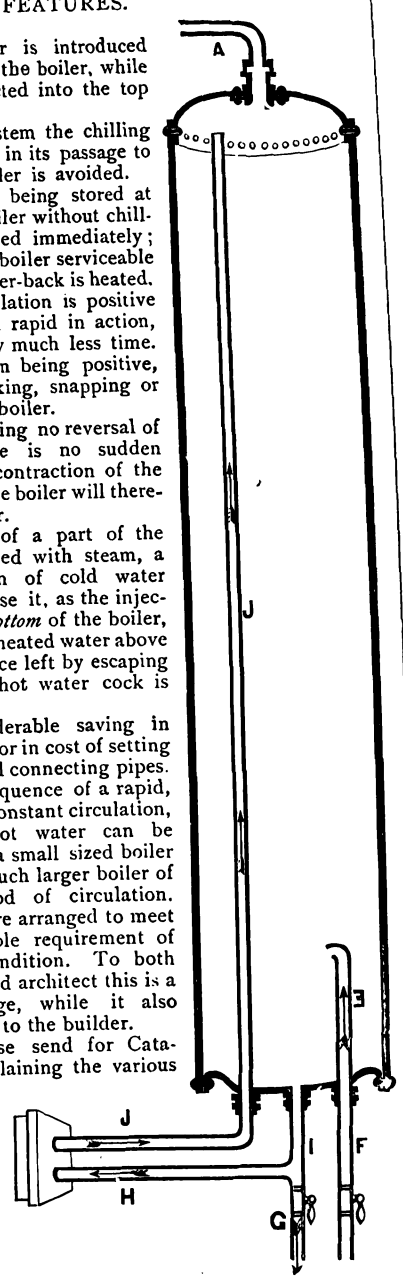

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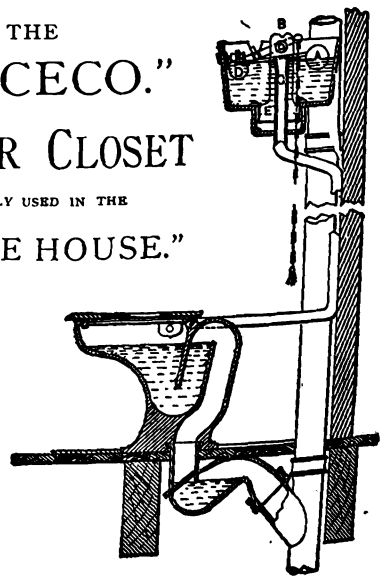

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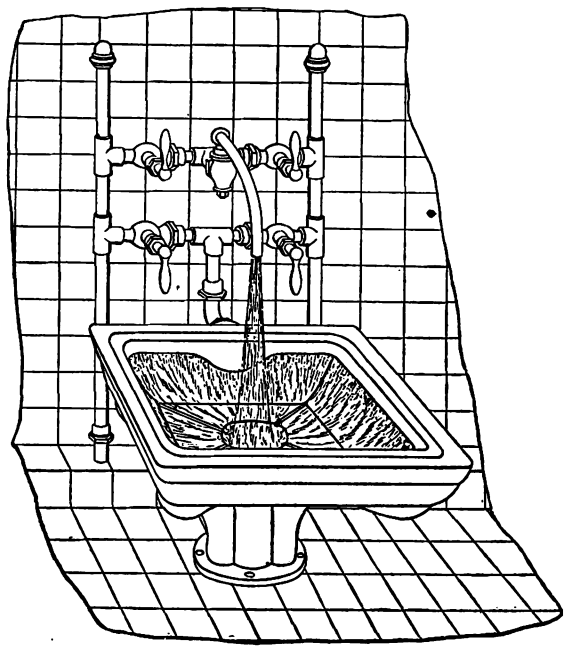

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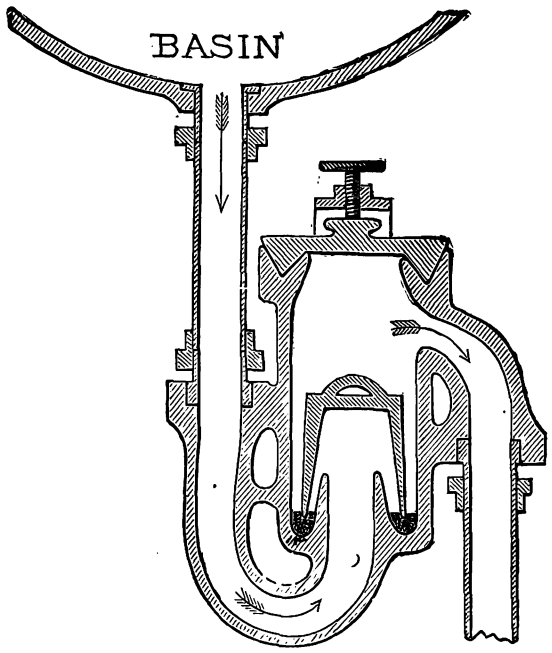

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POPULAR OPINION ABOUT SANITARY IMPROVEMENT.

We have printed at length on another page a communication from a Cincinnati correspondent, because it is a very good summary of the arguments used by the average alderman and ward politician against sanitary improvements or regulations. The scientific explanation or confutation which our correspondent calls for cannot, however, be made short, simple and universally comprehensible as he seems to suppose. Were this possible everybody would be scientific. Science is organized common sense, and in most cases it has to deal with probabilities, not certainties. A really scientific man freely admits almost all the statements made in this letter. Filth does not always produce disease, and when filth diseases are prevalent they do not attack all persons. There is no evidence that scarlet fever, or small-pox, or measles, or whooping cough are caused by filth. Those who urge sewerage, and common cleanliness on the ground that they will prevent these diseases, have either not studied the subject, or take the ground that it is justifiable to frighten people into good behavior by threatening imaginary dangers. This we do not believe. There is abundance of evidence that good sewers in a city diminish disease and mortality, that diphtheria, typhoid fever, diarrhœal diseases, some forms of lung, throat, and skin disease, etc., are connected with the presence of excreta and decaying organic matter in the air and water, and this evidence is contained in hundreds of volumes in which are recorded the experience of different cities and countries. It is the same kind of evidence which leads a prudent man to insure his house and his stock of goods. The facts that he has never lost anything by fire, that there has never been a fire in his block, etc., etc., do not influence him in the least.

That pseudo scientists are much more positive and dogmatic in their assertions about the causes of disease and the best means of prevention than the really well-informed scientific man is true. It is also true that it would be a good thing if the public could distinguish between the true expert and the pretender, but this is often impossible. Sooner or later it is true that the sanitary quack, like most other quacks, finds his true level, and that all his declamations, and public tions and reported interviews in newspapers fail to inspire confidence or to keep him in office—but for awhile he flourishes and makes it pay.

Yet those who really, honestly, wish to know where they can get reliable information with regard to the effects of sewerage, or the merits of different systems of drainage or water supply will not find it difficult to obtain it. We all know a few, a very few, men whom we consult with a reasonable certainty that they can either answer our questions or tell us who can, and most important of all, will honestly tell us that they do not know, when such is the case. We believe that the sanitary interests of Cincinnati are just at present in a bad way, and that there is a very considerable danger that it will become an unhealthy city, and suffer serious loss in its business interests.

It is in danger from an impure water supply, from defective sewerage, from a large amount of stored filth in privy vaults and cesspools and from its slaughter houses.

None of these things, nor all of them, may produce an epidemic; the probabilities of such a result are, however, at least ten times greater than those of fire on Fourth street, and there are few business men on that street who do not think it wise to insure.

It may be said in reply that sanitary precautions do not insure against an epidemic. True, but they go a long way towards doing so, and they certainly promote health, comfort and morality. Cincinnati should have expert advice upon her system of sewers and water supply. She should have a sanitary association, composed of the leading business men and most intelligent citizens of the community, and this associa- should employ a commission of three of the best engineers in this country to tell them what ought to be done. When they know this, they can then exert their influence to some good purpose. Without this, all effort is wasted, because uncombined and purposeless.

A decision which will have a most wholesome effect was given in the Court of General Sessions last Friday when John F. Crotty, of No. 232 East One Hundred and Twenty-first street, was fined $50 for violation of the plumbing law in his work on five houses on Alexander avenue. We have already exposed the character of this job. It now appears that after the specification had been approved by the Board of Health, Crotty, as he claims on the instigation of the owner, who seems to have appeared under an assumed name, paid no attention to the specification, but constructed the work in the shameful manner we have noticed. Crotty's punishment appears small for his offense; it was mitigated because he had shown a disposition after the work had been detected and condemned to do all he could to put it in proper condition. Moreover, Justice Bixby's remarks will effectually prevent any who may be inclined to imitate Crotty from expecting to escape with an equally light penalty. The

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Justice said he had made up his mind to send Crotty to the penitentiary and inflict the full penalty of the law, but in view of the mitigating circumstances he should only fine him fifty dollars, and he gave warning to others not to expect similiar leniency hereafter.

This prosecution has already done more to convince the skin plumbers that the Board of Health are in earnest than all that has heretofore been done. As a result of it, several men whose work has not been what it should be have set to work to remedy their violations of the law.

We last week printed the ordinance passed by the Board of Aldermen of the City of Boston, providing for the registering of plumbers and supervision of plumbing. It is exceedingly gratifying that this movement should have been instituted and carried through by the leading plumbers of that city. If they look after the enforcement of the law, the public and the craft will be greatly benefited thereby.

Since writing the preceding, we learn that in the new code adopted in the closing hours of the session, there was a clause repealing all ordinances not therein included, and, by an oversight, the plumbing ordinance had not been enumerated. We trust the matter will soon be righted.

The State Board of Health, of Louisiana has formally declared the Auxiliary Sanitary Association of that city to be meddlesome and useless, claiming that "instead of remaining auxiliary, it has striven to become supersidiary," and that it has especially sinned in approving "the useless, Congressionally-condemned and moribund National Board of Health."

As the Auxiliary Sanitary Association is composed of some of the most prominent and influential citizens of New Orleans, who are wise enough to see that the commercial interests of the city, which are their own, depend largely upon its healthfulness and good repute, and have striven to secure this, it seems probable that this defiant action of the politicians of the Board of Health will produce their downfall, a result which will afford very general satisfaction.

At the Theatre Royal, Brighton, England, the whole staff is instructed in the fire drill which is practiced after every evening's performance. Even the manager takes his part in it, coming to the front of the curtain and announcing that an accident has occurred and exhorting the supposed audience to go out quietly, while the rest of the staff are at their stations with the hose, hand pumps, and other apparatus which is provided. An eye witness of this drill, Capt. Shaw, of the London Fire Brigade, states that the drill was carried out in workmanlike manner, quickly and without confusion, and that in a few seconds all the fire extinguishing appliances were in readiness. At the same time attendants threw open all the doors and the audience would have had free egress from the house.

There were 6,600 water meters in use in New York City on September 30, or about 7 per cent. of the number of services. The Commissioner of Public Works reports that 1,579 inspections were made, and 143 cases of waste at night were discovered in the quarter ending September 30. This is a small proportion of the 100,000 connections in the city, and it shows that the number of inspections must have been very limited. The *City Record* recently chronicled the discharge of a number of waste inspectors. It is generally the case that when appropriations run short, employés who might be of some use are selected for removal for economy's sake.

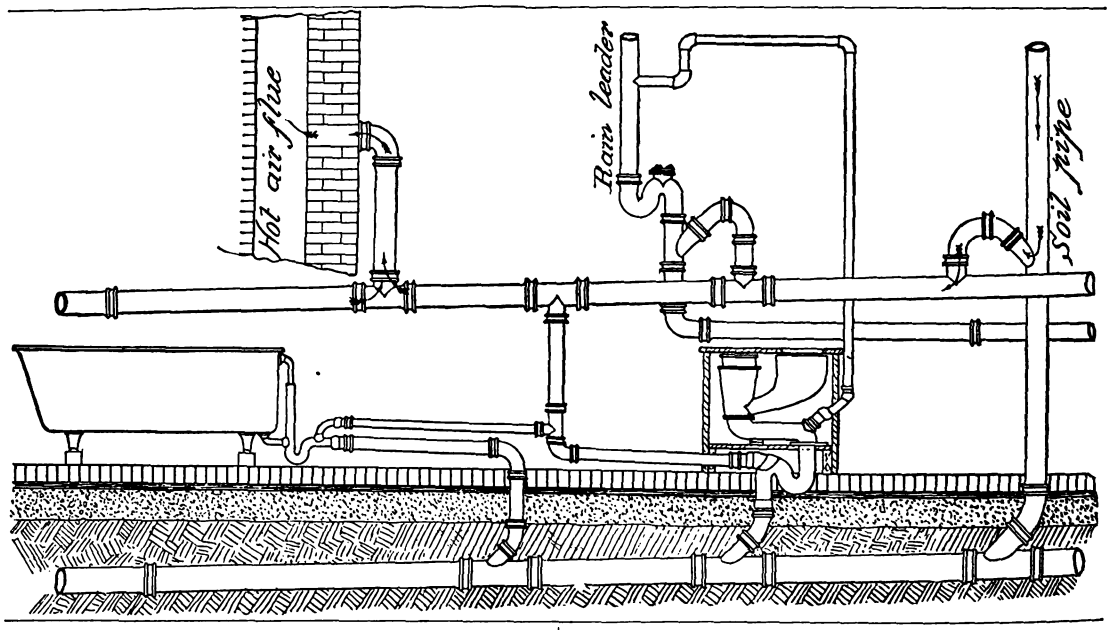
The Bowling Green Building Company of this city, filed a certificate of incorporation, the 27 ult.; object, the erection of buildings in this city; capital $1,000,000.

SANITARY ARRANGEMENTS IN THE RESIDENCE OF MR. CORNELIUS VANDERBILT.

(Continued from Page 75.)

VI.—The Drainage System and its Ventilation.

Here, as in his work in the residence of Mr. William H. Vanderbilt, Mr. Ennever has departed from the ordinary method of ventilating the drainage system. This, however, is not so bold a departure from the common method as was that. There, it will be remembered, traps were omitted from the main house drains and from water closets, but each soil pipe was trapped at its foot and a ventilating pipe taken from either side of this trap, serving to ventilate the whole system, even to the street sewer. (See The Sanitary Engineer of April 27, 1882, Vol. V., page 460.) Here there are the usual traps on the main drains but the fresh air inlets now required by the Board of Health are omitted, this work having been commenced before the plumbing law took effect. In place of them the soilpipes are designed to serve as fresh air inlets, by connecting them at the bottom with a heated chimney flue. The air pipes from the traps of all fixtures in the cellar, basement and first floor (except the line of slop sinks, which are all connected with the same air pipe, extending from the lowest trap to above the roof) are connected with the same hot air flue instead of being carried up through the roof in iron pipes, as is customary, and the rain leaders are also connected to this flue from below the traps near their lower ends.



This is all shown in the accompanying drawing, which for the most part represents what appears in the servants' bath room in the cellar. For the sake of grouping the whole arrangement into one drawing, the chimney flue and the connection of the main horizontal pipe with it is brought in from beyond the limits of the sketch as also the soil pipe and its connection with the horizontal air pipe which is generally not so short and direct as shown.

There are two main air pipes nearly horizontal, like that shown in the drawing, one on each side of the house near the outside walls, having connection with all the soil pipes, rain-leaders and traps of fixtures below the second floor. The two mains are united near the branch connecting with the chimney flue, by a full-sized pipe running along under the basement floor from one side of the house to the other. The connections between these main lines and the traps of fixtures are often made very circuitous, in order to get around partition walls in the cellar or have the pipes out of the way; and the vents for the traps throughout the house are, most of them, taken, not from the crown of the trap, but generally from six to ten inches below that point.

Another interesting feature shown in the drawing is the connection between the water closet waste and the rain leader. The water closets are of the plunger type, but without the trap which sometimes forms a part of the closet; in place of it is an arm or offset which requires a vent at its end to allow the escape of air when the plunger is lifted. In the cellar and basement and on the first floor these vents are taken to rain leaders above the traps, as shown in the drawing. The connections are of galvanized iron except a short piece of lead at the foot. From the closets above the first floor separate air pipes are carried up through the roof instead of connecting them with rain leaders.

The reason of the indirect connection of the bath waste with the drain is that the bath was not at first intended and the brick and cement floor had been laid (from the left) up to the point where the waste pipe goes down, where the flooring had been interrupted by temporary closets for workmen.

The cellar floor consists of bricks set on edge in Portland cement, on two layers of asphalt (each about ⅜-inch thick), which covers a bed of concrete (consisting of two parts of sand to one of Portland cement) four inches thick. The drains are deeper than this for a considerable portion of their extent, and there they rest on the earth or rock bed in the special excavation made for them.

There are two connections with the public sewers, one with that in Fifth avenue and the other with that in 57th street, under the lawn which runs back to that street and the two are united under the house. Each is of iron, eight inches in diameter; inside the house they are reduced to 7-inch, 6-inch and 5-inch. The traps on them are just outside the house under the flagged area. Brick man-holes with iron covers give access to them. Just inside the traps the drains have connections with the area cesspools, all of which are trapped, some by masons' or cesspool traps, and others by turning down the outlet pipe.

The drains in the cellar above the floor and the horizontal air pipes are generally supported on brick piers to a height of from two to three feet, and above that height, are supported on the walls by iron brackets or from the ceiling by hangers. The soil pipes are mostly in brick recesses in the walls, some of which are accessible and some not accessible. The ordinary air pipes are, as a rule, one inch smaller than the accompanying soil or waste pipes. Above the first story they are taken up through the roof independently, in the usual manner, while those below the second story, as before stated, are connected with the heated flue. The ends of the pipes above the roof are protected by ventilating caps.

The refrigerator wastes are through 2-inch wrought iron pipes entering a cast iron cesspool

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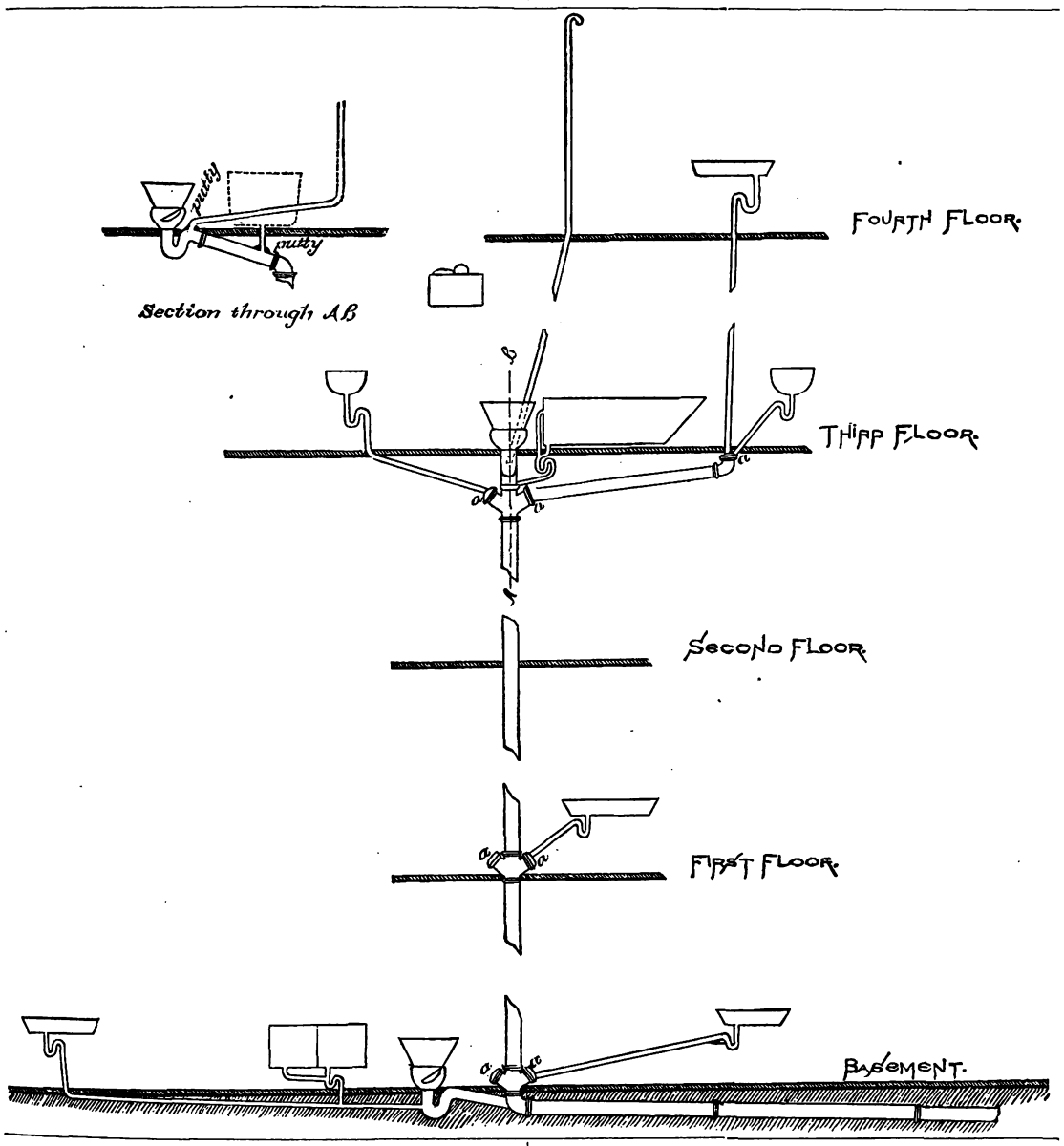
about 14 inches by 18 inches in the cellar bottom. That from the large refrigerator in the cellar passes down to the bottom of the cesspool and turns up several inches. That from the refrigerator up stairs receives the waste from a fountain and has a deep (8-inch) trap on it before entering the cesspool, into which it dips several inches. The outlet to the drain is through a 3-inch pipe, which dips nearly to the bottom of the cesspool. An iron cover in the top gives access to it for removing deposits.

The present article concludes the description of the plumbing in this house.

A CASE OF VERY BAD PLUMBING.

To the Editor of THE SANITARY ENGINEER:

The following case of dangerous plumbing came to my notice to-day and I send you the particulars, knowing that you have taken up the exposure of such work in the city.



Some time since the Board of Health was called upon to examine the premises No. 310 West 36th street, an English basement house about 12 feet wide, evidently built for a private residence, but now sub-let by the lesee to several families, making it a tenement. An order was made on the owner, E. Crawford, of 220 West 28th street, to carry the soil-pipe above the roof. Not feeling satisfied with the work done under the order, the inspector asked me to look at the case with him, and together we made a thorough examination—tearing up woodwork, etc., and found enough to convince us that the complaints of bad smells, headaches, etc., were well founded.

By referring to the accompanying sketch, you will see that the soil-pipe is ventilated by a two-inch iron pipe. This was the so-called compliance with the order. The work was said to have been done by the owner himself, who, it is reported, never employs a mechanic, as he says he is an engineer and knows as much about plumbing as any plumber, and this is the way he did the work: The cover of the light-shaft which leads from the bath-room was taken off; the two-inch ventilating-pipe was put together in lengths, run up the shaft, and then, with a couple of bends brought to the trap of the water-closet. A hole was dug in the crown of the trap, the end of the pipe set over it and everything made tight (?) with some putty and a rag. The end of the bath-waste is set over a hole knocked in the soil-pipe and secured with putty. The plugs *a a*, etc., of the soil-pipe are of cement, and cracked where the waste-pipes join, so that a knife can be inserted between the pipe and cement. Being unable to tear up the basement floor, we tried the pepperment-test on the house-drain and found it even more defective than the upper part of the work. An order, covering these defects, will be made on Mr. Crawford.

Yours truly,

FREDERICK W. OWEN.

TYPHOID FEVER AND LEMONADE.

During the ten weeks, ending September 23, last, a sudden and considerable epidemic of enteric fever affected the urban and portions of the rural districts of Evesham. The total number of attacks in the former district were 48, and in the latter district 21. At first sight the patients appeared to have nothing in common which could account for the disease. The houses in which they lived were in many instances several miles apart, the sanitary circumstances of the dwellings varied widely, sewers and water supply were entirely different, and the milk supply was derived from several independent sources. It was, however, elicited that one and all of the patients attacked before August 8, whether residing in the town or in the country, had attended Evesham regatta, and that they had all been present in one special meadow. The circumstances of this meadow had to be very carefully considered, because it was the locality in which two sewer ventilators were placed, and near which were sewage settling tanks. But for reasons given, these conditions could not be identified with the epidemic, and a fresh cause had to be sought. It was then ascertained that of the 46 persons upon whom the "regatta influence" could have operated, 32 had certainly, and 11 had most probably, taken water in the form of lemonade, or to a less extent in the form of ices, or again, as an admixture with spirits, at a certain refreshment stall; and even as regards the three remaining patients it could not be said positively that they had not partaken of one or the other of the articles in question. The water, which had certainly been used for some, and which had probably been resorted to in the case of all, of the refreshments, was procured from a well which was situate near the meadow, and which was found to be so seriously contaminated that it was at once closed under the magisterial order. As confirmatory of the view that the refreshments and the disease were related to each other as cause and effect, Mr. Fosbroke, the Medical Officer of Health, cites some interesting details. Thus, a party of three persons repaired to the meadow in question on the regatta day; two of them partook of lemonade and subsequently developed unmistakable symptoms of enteric fever; the third took no such refreshments and altogether escaped. The only point in Mr. Fosbroke's reasoning which appears to be at all inconclusive is the circumstance that in order to associate some of the attacks with the polluted water used in the preparation of the refreshments on the regatta day, it becomes necessary to admit a longer period of incubation than is usually met with in the case of enteric fever. Still, 27 cases were recognized within 19 days of the date of the regatta, and though some appeared to be developed after an even longer interval, yet it is quite possible that this may have been due rather to a difficulty in determining the exact nature of the early symptoms, than to the existence of a prolonged incubation period.—*Lancet.*

MODERN SANITARY LEGISLATION.

The *Builder* publishes an abstract of an address by Prof. Reklam, of Leipsic, at the Brunswick Hygienic Congress, in which he makes a comparison between the legislative measures adopted by the leading nations for the advancement of their sanitary condition. The system of hygienic legislation of France is fairly well planned but inefficiently carried out. Much the same state of things exist in Italy and Spain, though in the latter country the medical boards are doing good service at present. The position of sanitary matters in Belgium exhibits a kind of compromise between the systems in operation in France and Germany. The *Conseil Central de Salubrité publique* is the leading sanitary authority, and although not in a position to enforce its recommendations, they are voluntarily submitted to by nearly all the local authorities of the country. In Holland each district has its sanitary council, but there is likewise in each case an inspector appointed by the Government, who acts as an intermediary between the local and national authorities.

He attributed the increased attention given during the last forty years to sanitary matters in England to the cholera epidemics. In Germany progress had been slower, but now an efficient system is provided by the Imperial Sanitary Administration, with its various local organizations. In some States the local medical bodies elect members to the Boards representing groups of districts, and these Boards send deputies to the head administration. In other States comparatively little progress has been made, on account of the apathy of those concerned, and Prussia is, more than any other State, open to such a charge, sanitary legislation being there in a backward condition.

In Switzerland there has been by popular desire an abrogation of some laws affecting sanitary matters.

The speaker considered that the fault of all modern hygienic legislation consists in the fact of its having been in most cases enacted at different times, and thus not forming a harmonious whole. Two sanitary codes have come into force, however, within the last year, which he quoted as models of what legislative enactments of this kind ought to be. In Finland, Prof. Hjelt has devised a law which meets all the requisite emergencies. In every town there is to be a sanitary commission, which consists of the chief of the police, the municipal architect, the local medical officer, and three town councillors. The whole *surveillance* of sanitary matters is in their hands. This law deals with town and country hygienic measures in a uniform manner and provides for children's playgrounds in every town.

The regulations now in force in Servia place the authorities of that country, according to Prof. Reklam's view, in the front rank of sanitary reformers, Servia being the only European country which has an independent sanitary budget. Its hygienic code has been elaborated by Dr. Gjoryjorics, and although only introduced last year, is now in practical operation. There is an annual revenue of nearly 50,000*l.* devoted to sanitary measures.

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CINCINNATI SEWERAGE.

UNSCIENTIFIC OPINION AS AN OBSTACLE IN THE WAY OF IMPROVEMENT.

[From our Special Correspondent.]

Whether thorough sanitary provision in any city can be made against the ravages of disease depends upon the prevailing sentiment of the unscientific citizens, since those permanent provisions, such as sewerage, healthful water supply, and the like can be only effected with their consent expressed in municipal legislation, and even sanitary police regulations, provided for by statutory law, cannot be efficiently enforced against their opposition. This opposition has been expressed in every direction in Cincinnati, and is in no small measure due to want of confidence on the part of the unscientific public in the opinions of those quasi-scientists usually at the head of sanitary affairs in cities, and in the opinion of the ordinary physician, who knows and cares less about the origin than the cure of disease. The thought has impressed itself upon the mind of the writer that there could not be a better thing written in the interest of the general public than a scientific explanation or confutation of the unscientific man's alleged facts, and his opinions founded upon them. It would be certainly far more potent in securing the adoption of sanitary appliances and in enforcing sanitary regulations than the nice questions that scientists delight to make issues of between themselves. In the very heart of Cincinnati, westward and south to the river, is a large and populous district, containing, perhaps, one-fourth of her population, without any sewerage. Over ten years ago there was introduced into council a sewerage ordinance to supply this district with sewers at the cost, of course, of the abutting property holders. The people at once announced their unscientific theories and made war upon the ordinance. They declared that the sewers are not a necessity, and pointed to the comparative healthfulness of the residents during both healthful seasons and seasons of plague. They alleged that such is the character of the deep soil underlying the bottom portion of the city that the contaminated fluids from vaults and surface drains are absorbed by it, and that if they contain the germs of typhoid and a thousand other diseases, the heroic soil smothers the life out of them and prevents the accomplishment of their malignant work. A month or two ago, however, after a ten years' war, on considerations of personal comfort mainly, the ordinance was passed against the protests of the representatives of the district. It is yet doubtful if the work will be done. Nearly all the upland suburban districts of the city are also without sewers. Every heavy rain fills up their vaults, and if they can secure no under drainage, their cellars also, while the health board have declared overflow pipes into open gutters nuisances All the hill people believe in the germ theory, and have been looking forward to the coming pestilence. Eastern hill-top sewerage, however, is a costly undertaking, since it must have its outlet in the river west of the water works. The property owners cannot stand the expense of the main sewers, and consequently they have made common cause, and prepared a bill, providing for an addition of one mill to the tax levy to be devoted to the building of main sewers in the city. An effort will be made to have it passed by the Legislature this winter. Against this, however, the unscientific districts, and those already sewered, are expected to "kick" and its passage is perhaps doubtful. It will be perceived, therefore, that among the masses there is no dread of disease from want of sanitary appliances that will weigh against the fear of being taxed to construct them. The same is true in regard to the enforcement of sanitary regulations. Vaults are permitted to stand full, decayed vegetable matter is permitted to litter the yards and gutters, and catch basins are made the receptacles of animal offal, because quasi-scientific opinion has no weight with the masses. For these reasons and that they may be confuted the writer presents the arguments of the average unscientific man who is impressed with a conviction that there are factors in the conditions producing diseases which are both unknown and overlooked, and which perchance are not always found, and do not necessarily exist in drain, cesspool or sewer, or in the gases which they exhale. For example, just now there is typhoid and scarlet fever in Cincinnati, and it is not uncommon to hear physicians deprecate the bad sanitary conditions of this or that locality. Yet the sanitary conditions, say the unscientific men, are the same as they have existed, year after year, in those localities, when no such disease manifested. The conditions are no worse, in fact to all appearances the same as in ten thousand other places in the city where the diseases have not appeared. And not only in the cities, but the villages, and in the farm houses here and there on the hill side, and in the valley, all over the continent are to be found typhoid and scarlet fevers, where neither drains, nor sewers, nor cesspools, nor the noxious gases are supposed to exist. As with the diseases named, so with every other. Relying upon the assumption that like causes produce like effects, the unscientific man is apt to entertain a suspicion that much of the scientific theory about the origin of disease germs is claptrap. The unscientific man observes that in the vicinity of marshy streams and swamp lands malarial fevers prevail in the fall, to which some are susceptible and others not; that personal uncleanliness produces skin diseases in some, while others who are filthy from one year's end to another are entirely free from them; that time out of mind famine and pestilence have gone hand in hand; that poor food, little of it, irregular habits of drinking, eating and sleeping, artificial stimulation and exposure let in any and every disease upon the human organism, and that when epidemics prevail in populous cities where the conditions last enumerated obtain, as a result of protracted hard times, its ravages are fearful and greatest among the poor; but when the poor are well fed and clothed in good times, the unwelcome visitor does not nicely distinguish between the cleanly mansion and the filthy tenement, save that as the latter is more crowded it may find proportionably more victims. The unscientific man, therefore, has his doubts about a host of diseases lurking in closet pipes, surface drains, sewers, cesspools, and like receptacles of refuse; and in this homely way of arguing the matter will point you to the hosts of those, in a great city, who year after year stand at the beam in the tanneries over decomposing flesh, who follow the occupation of public scavengers, who descend into one catch basin after another, who as vault-cleaners spend half their waking hours in the midst of intolerable stench, and are nevertheless as healthful as other men. He has a general sort of a notion that whencesoever diseases spring they are generated over large districts in a mysterious manner and quite independent of the vaults, cesspools or sewers of large cities. Some are disposed to believe them the results of malign planetary influences; some regard them as special Providences in punishment of national sins from which we cannot escape, and others see in them the workings of a law of compensation and equilibrium that provides against over-population, and from which the human race cannot hope to escape. In fact the disposition of no small portion, were it not that cleanliness secures comfort, is to sit down in the midst of filth and take the chances.

[We print elsewhere a comment on this letter.]

Mr. Richard Prescott recently read a paper before the Troy Scientific Association, taking for his subject house drainage. A very full abstract of the paper is given in the Troy *Times* of Dec. 21, and we have been much pleased with it. The only exception which we take to Mr. Prescott's statements and advise relates to the following sentence. "Finally, we are prepared to say that in a house plumbed in accordance with the requirements of sanitary science, scarlet fever, typhoid, diphtheria, meningitis, etc., will not originate, while they are certainly invited by the absence of such precautions." It is not quite certain in what sense the word "originate" is used in this sentence. If it is meant in the sense of occur, the statement is certainly incorrect, for these diseases occur in the best arranged houses. If it is meant in the sense of spontaneous origin, *i. e.*, by the influence of filth alone, without germs from a preceding case, the statement is true but valueless, for these diseases do not occur spontaneously in any house. Good plumbing is a very good thing, it prevents a great deal of sickness, discomfort and death, but it is not an universal panacea. There are many ways in which germs of typhoid, scarlet fever and diphtheria gain entrance to a house besides the drain pipes, and as to meningitis, it has prevailed most fiercely in houses where there was no plumbing whatever.

We think Mr. Prescott is doing good in instructing the public as to the difference in good and bad work—and it is very possible that in the above sentence he has not been correctly quoted. We call attention to it simply because we are satisfied that some of the greatest obstacles to the progress of sanitary work are due to the fact that some of its advocates promise too much, and that the better plan is to rather under than overstate its advantages.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Dec. 30.....	22.42	18.27	20.74	26.27	28.38	19.24

E. G. LOVE, Ph.D., *Gas Examiner.*

GAS *Versus* ELECTRIC LIGHT IN DOWN-TOWN STORES.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR:—Perhaps the following statement about the comparative cost of the Edison lamps and gas in a printing establishment (E. P. Coby & Co.) in this city, may be of interest just now, when the public is waiting, with some anxiety, the outcome of the effort to supplant gas by incandescent lamps in down-town stores.

In the establishment in question, the Edison lamps were put into the counting-room, first floor, on trial, to get a basis on which the cost could be afterward adjusted, and for this first month's trial the lights have been free. Within a few days, however, the company have sent out a statement of the amount of light given between certain dates, and the value of it on the basis on which hereafter they will charge their consumers, viz.: $1.00 per 1,000 candles, which, according to the company, is about equivalent to gas at the present rate, $2.25 per 1.000 cubic feet. This, however, does not seem to be the case, at least with this establishment, as the following facts will indicate.

There are seven of the Edison incandescent lamps in the counting-room, of the ordinary size in down-town stores, to replace five gas burners. Owing to defects in the carbons, which have usually left one of the lamps useless, it has been necessary to light one or sometimes two gas burners in addition to the electric lamps. Under these circumstances, a statement is rendered by the Edison company for the period from October 10 to November 13. Total amount of light furnished was 13,246 standard candles, for which, had the company charged their proposed price of $1 per 1,000 candles, the cost would have been $13.25. Messrs. E. P. Coby & Co. estimate that, taking both cloudy and fair weather together, the lamps have burned possibly five hours on an average daily. At about the same time this statement was received from the Edison company, the Mutual Gas Company rendered their bill for gas used in the press room and composing rooms. Connected with one meter are 25 6-foot burners on the two floors, and also the one or two which are used in the counting-room. Of this number 23 are regularly lit, including those in the counting-room, and burning on an average 1½ hours per day. The gas furnished by the Mutual Company, as appears from the weekly statement in THE SANITARY ENGINEER, has an illuminating power of 25 and upwards. The price of gas is $2 25 per 1,000 cubic feet and the bill for the burners enumerated, from October 23 to November 22, was $10.35, representing a consumption of 4,600 cubic feet of gas.

Now, assuming that six of the seven electric lamps were always in good order and lighted during the 5 hours per day when artificial light was necessary, the case would stand thus:

6 lamps, 5 hours each = 30 hours per day; 23 gas burners, 1½ hours each = 34½ hours per day.

Number of days from October 10 to Novembor 13, 34; total hours of electric lights for that period. 1,020.

Number of days from October 23 to November 22, 30; total hours, gas burners, for that period, 1,035.

Cost of 1,020 hours, electric lamps, $13.25; cost of 1,035 hours, gas burners, $10.35, or about 35 per cent. in favor of gas.

The hours in which the gas burners were lighted have, in the opinion of the gentlemen named, been rated low as compared with the hours during which the electric lamps burned, and in reality the facts would be rather more favorable for the gas.

As to the quality of the light furnished, it is the opinion of Messrs. E. P. Coby & Co. that the gas burners gave more light than do the lamps. An experiment made by

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turning off one of the lamps at the rear of the office and turning on a gas burner, and then reversing the test, seemed to prove their opinion correct; certainly the gas light appeared to illuminate that part of the office better than did the lamp.

It is to be noticed, in conclusion, that this comparison is with gas at $2.25 per 1,000 cubic feet, a price which it is believed is much above what the gas companies are able to furnish gas at, if they choose to do so.

I have submitted these facts to you for your opinion, fully recognizing that the data given are quite few in number to base a general opinion as to the cost of electric lights and gas on. Still, as we have here, side by side, the bills of both the gas company and the electric light company for the same season of the year, each bill rendered without any thought that it would be used for comparison, the figures cited may be taken as a finger pointing to the real facts in the present dispute between gas and electricity. X.

[As our correspondent says, the data given are not very satisfactory for making comparisons. The rooms lighted are not the same, and there is nothing but guess work as to the comparative lighting effect produced by the two systems. It is stated, however, that in the opinion of the proprietors more light was furnished by the gas burners than by the electric lamps.

It would be a simple matter to connect the gas burners in the counting room with a separate meter, and when the burners were in use to so adjust them that the amount of light furnished should be approximately equal to that of the electric lamps. Some rough photometric observations might be made to aid in equalizing the light from the two systems.

A closer comparison might be made than the one to which our correspondent calls attention. Take the case of the counting-room, in which six incandescent lamps were employed. These lamps are usually rated at 16 candles each, at least this is the company's estimate of them. Then suppose these lamps are in use for five hours daily for twenty-nine days, as given in the company's statement, and we have 13,920 candles. The statement of the company gives 13,246 candles. The monthly bill for incandescent lighting would then be $13.92.

It is also stated that the lamps replaced five gas burners, but as it was necessary to light one burner in addition to the lamps, we can say that the six lamps replaced four gas burners. The burners are stated to be six foot burners, but as it is somewhat doubtful about the burners passing six feet per hour of the Mutual gas we can place them at five feet, and safely assume that the illuminating power is 25 candles. Then if the burners are in use five hours per day and for twenty-nine days, we shall have 14,500 candles.

The gas consumed in this time would be 2,900 cubic feet, and its cost $6.52, or about one-half that of the incandescent lamps. Whatever may be the other claims urged for the incandescent lamps it is clear that as regards cost, the gas burner is very much more economical. —ED. SANITARY ENGINEER.]

ELECTRIC LIGHT NOTES.

A London dentist uses a small incandescent carbon lamp to illuminate the cavity of the mouth during operations.

Two ships of the Union Steamship Company, of New Zealand, are to be lighted by the Edison incandescent lamps.

A premium of £500 has been offered by a Mr. Ellis Lever, says the *Review of Gas and Water Engineering*, for the invention of the best portable electric lamp for coal mines.

One hundred and forty applications for provisional orders under the new Parliamentary electric lighting bill were made to the board of trade up to Dec. 21. Twenty-four of them were made by the Metropolitan Brush Electric Light and Power Company. The Swan Company applied for four orders; the Pilsen-Joel for three; the Incandescent Electric Lighting Company for five; Ferranti, Thompson & Ince for two.

The Edison Electric Light Company is now lighting 225 houses in this city, wired for 5,000 lamps. The residence of J. Pierpont Morgan is lighted by an isolated plant of 269 A and 116 B lamps, arranged as follows: Main halls and stairway, 39; attic rooms and halls, 14; dome over stairway, 20; servants' halls and butler's pantry, closets, etc., 15; 3d floor bed-rooms and dressing-rooms, 20; 2d floor bed-rooms and dressing-rooms, 40; 1st floor—drawing room, 42; reception room, 11; library, 10; sitting-room, 22; dining-room, 22; stained glass skylight in dining-room ceiling, 22; conservatory, 42; basement, 28; cellar, 28; stable and carriage house, 6; engine-room, 4

Professor Silvanus Thompson has been investigating the origin of the electric light. Davy is supposed to have discovered it either in 1809 or 1813; but it appears Messrs. Caballo and Cuthbertson gave an account of the carbon arc in 1806. There is a published notice of some experiments of Sir Humphrey Davy in the *Philosophical Magazine* for 1804; and in a French journal of 1802 there is an announcement concerning the display of a light from carbon pencils, by a M. Etienne Gaspard Robertson. The light in the latter case was procured by means of a large pile. It is impossible, at this time, to say whether Davy or Robertson was the first to discover the electric arc. Professor Thompson believes, however, that there is an entry in a laboratory note book at the Royal Institution which seems to show that Davy discovered it in 1802. In any case, the electric arc light is quite 80 years old; and it may have been noticed independently by several persons, since it must have been manifested in the course of the simplest experimental handling of a large pile. Up to the present time invention has been exhausted in endeavors to embody this very simple discovery in practicable shape.—*Review of Gas and Water Engineering.*

Seven electric light companies applied for the lighting of Chelsea Vestry, London. To guide them in their decision, the vestry addressed a list of questions to the companies and also to Siemens' Brothers. The Brush company proposed to replace 1,250 street gas lamps with 400 arc lights of 2,000 nominal candle-power each, for which the first annual cost would be £10,000 or $50,000. For other purposes than street lighting, they would supply Lane-Fox lamps of 10 to 100 candle-power, at 6*d.* per 1,000 erg hours. The Edison Company gave no definite reply. It would employ only incandescent lamps, but although it is now lighting the Holborn viaduct at the price of gas, that contract could not be made a precedent. The Jablochkoff Company estimated 1½*d.* per lamp per hour as the probable cost to the vestry. The Swan Company would take gas as the basis and supply an equal amount of light for the same price, stating that this would leave no margin of profit until improvements are made in the production of the current. The Ferranti Company would work a station at a price which would furnish a dividend of 10 per cent. on the capital—about twice the cost of gas for three times the amount of light. The Pilsen-Joel Company gave no estimate of cost, and Messrs. Siemens' Bros. & Co. made no direct reply, referring the vestry to Dr. Siemens' address.

Meter-ites.

The United States Equitable Gas Company, of this city, was incorporated the 28th ult., capital, $2,000,000.

Judge Arnoux has dissolved the injunction obtained by one Michael Noonan, restraining the mayor from granting permission to the Equitable Gas Company to lay pipes in the streets of this city.

Mr. Edward Stern, the original promoter of the Municipal Gas Light Company, of this city, and more recently the organizer of the new Equitable Company, died on Jan. 1st, at the Hoffman House.

Whether from threatened competition with electric light companies, from public dissatisfaction with existing prices or from whatsoever reason, the Hartford, Ct., Gas Company have voted to reduce the price to private consumers from $2 to $1 90 per 1,000 cubic feet, the reduction to date back from December 1. After the first of January the price to the city will be $1.80 instead of $1.90 as at present.

The Paris Gas Company are laying a new main, one metre in diameter, the material being bitumenized cast iron. The pipes, says the *Journal of Gas Lighting*, are laid in a bed of hot bitumen mixed with fine gravel. This composition is said to acquire great strength and consistency in cooling, and to protect the sheet iron so well that it does not deteriorate or oxidize except in a soil saturated with damp.

A petroleum engine constructed in Hanover has been experimented on by a Professor Schottler. His results are printed in London *Engineer*. Its general plan is similar to that of the gas motor on the system of Wittig and Hees. The petroleum flows from a closed reservoir through pipes, in which there are two slide valves and one cut-off valve. It unites with the air introduced by the pump cylinder. The explosive mixture is compressed and then forced into the working cylinder, where it is ignited. In four trials the maximum force obtained was 4.5 horse power; the greatest number of revolutions was 103 per minute. The consumption of petroleum per hour for each horse power was 1¾ to 2½ pints. In this estimate of the consumption of petroleum, the quantity used for the kindling flame is not included, as it is fed from a special reservoir. It is stated that this petroleum engine costs no more to work than a gas engine. In regularity of working, the engine was found during the experiments to be superior to a gas engine.

CREAM OF TARTAR.

NEW YORK, *Dec.* 23, 1882.

To the Editor of THE SANITARY ENGINEER:

The proceedings taken by the State Board of Health against grocers for selling adulterated cream tartar have made an impression upon the consumer. I am asked now if the cream tartar I have for sale is pure—a question I do not remember being asked before the adulteration of the article was made public. Will you please say what amount or per centage of mixture is allowed by the Food and Drug Law and oblige, yours respectfully, GROCER.

[Something will certainly be gained if the consumer can be induced to ask if the goods he buys are pure. There is no difficulty in defining "pure cream of tartar." The last edition of the U. S. Pharmacopœia allows the presence of six per cent. of tartrate of lime; and as the Food and Drug Law recognizes the standards of the Pharmacopœia anything in excess of this amount is below the legal standard. Flour, ground gypsum, etc., is not allowed. This is the only article which can be sold for cream of tartar. At the same time the State Board of Health have the power to permit the sale of certain mixtures to take the place of this salt, but if such mixtures are sold for cream of tartar it is a violation of the law. Up to the present time the Board of Health have taken no action in regard to the establishment of standards. If the Board are not intending to recognize any "mixtures," the sooner this is made known the better.]

WHAT RETAIL GROCERS WANT.

The Retail Grocers' Association held a meeting in Beethoven Hall last evening and adopted resolutions that no member of the association should purchase goods of any jobber who would not give a written guarantee that they were pure and unadulterated, and that the Law Committee of the association should defend any member selling adulterated goods if the committee believed that they were bought in good faith and a fair price paid. A committee of five was appointed to confer with the State Board of Health in regard to the adulteration of food.—*N. Y. Times.*

[This is all right, but the committee should prosecute the wholesale dealer who sold the adulterated goods rather than resist the law, and not put their members to the cost of individually carrying on suits in such matters. The State Board could be of material assistance to them also.—ED. SANITARY ENGINEER.]

A meeting of farmers interested in shipping milk over the Erie Railway was held at Middletown, N. J., Dec. 26, and resulted in a permanent organization. The immediate purpose of the organization seems to be to control the price which they assert is now fixed by the dealers in their own interest. They also took action calculated to diminish the amount of skim milk put on the market, which has also tended to reduce the price at which the genuine article can be sold. The Erie Railroad offered to establish with other railways a can exchange, so as to furnish every facility for a milk inspector on trains who shall be authorized to dispose of adulterated or skimmed milk; to return all unsold pure milk to the farmers free of charge both ways; to collect the price of milk with freight when requested, and to remit it without charge. A mass meeting of farmers will be held at Goshen, January 6, to appoint milk inspectors and to carry the plan into operation.

A NEW LITANY.—District Visitor: "Your boy looks very bad, Mrs. Jones; what's the matter?" Mrs. Jones: "Yes, ma'am, he be very bad, and, what's more, the doctor has made him worse. I'm sure we poor people ought to pray with all our heart, 'From all false doctorin', good Lord, deliver us.' I never saw its meaning afore."—*Medical Times and Gazette.*

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Correspondence.

HEATING STORES WITH STEAM.

OWEN SOUND, ONT., *Dec.* 23, 1882.

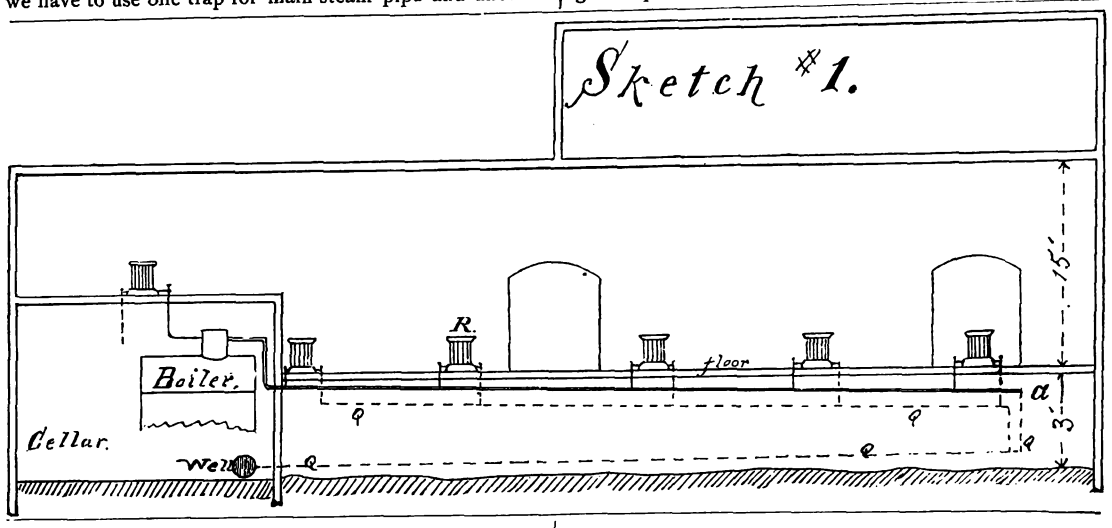
To the Editor of THE SANITARY ENGINEER:

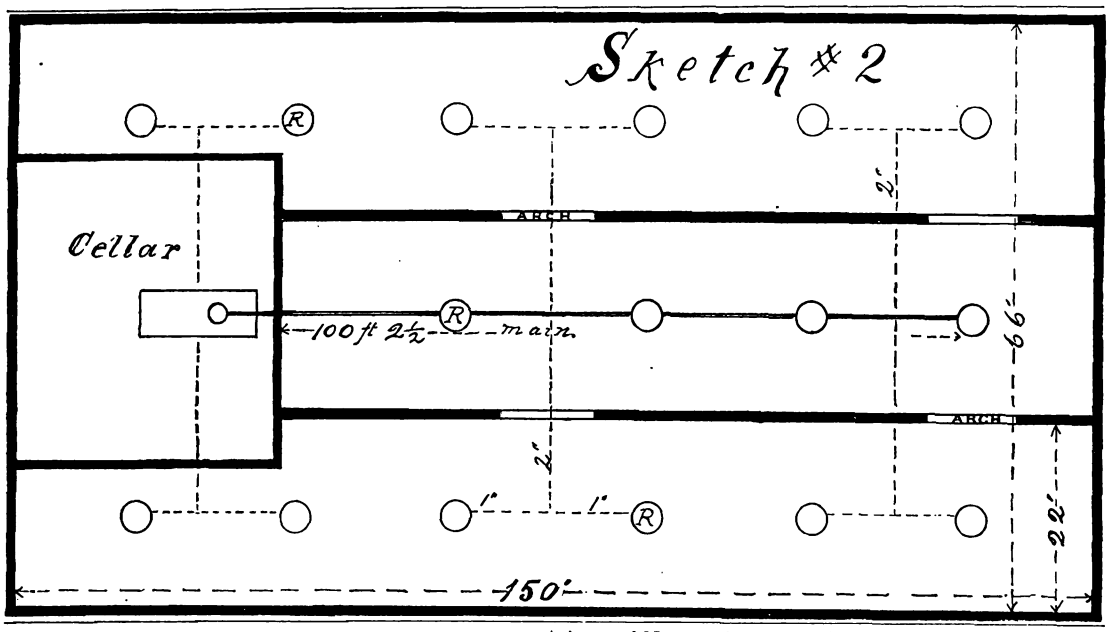
We wish to heat our three stores with steam, and enclose a sketch showing our position. You will observe we have only three feet of cellar (exaggerated in the sketch), hence our main pipe, 2½ inches, will be as low as bottom of boiler. Sketch No. 2 will show position of heaters; the dotted lines show cross mains of 2-inch pipe. The circles (*R*) on sketch show position of radiators. Are mains right size to supply at a pressure of three pounds? Can we trap main steam pipe and all returns from heaters on ground floor through one large trap into cistern, or will we have to use one trap for main steam pipe and another for all the heaters, and at what position will we place our trap or traps, as the case may be? How would you advise getting water back from well to boiler (boiler cannot be lowered)? By answering this you will greatly oblige.

CONSTANT READER.

P. S. What number of tubes in each heater should we use?

[We would advise that the main (100 feet long and 2½-inch pipe) be run 4 inches from the dome of the boiler to the point marked *a*. A smaller pipe, 3½ or 3 inches, may be made to do, and unless one had an opportunity to contrast it with an apparatus with more ample mains, he might not be aware of the benefit he would have reaped. Use 4-inch pipe.





The cross branches of 2 inches are sufficient, but the radiator connections (shown 1 inch) could be increased to 1¼ inches at a small expense and reduced, close to the valve, to 1 inch, if necessary. This would give the water which will form within them a better chance to run back to the main, as it will be necessary to pitch the 2-inch pipes and their branches to the main, in such a contracted space.

A very good system of return pipes for an apparatus of this kind is to start at *b*, a few inches under the steam main (sufficiently low for its branches to cross below the main), and pitch in the same direction as the main; relieving the main at *a* into it and returning to the hot-well or trap through a separate pipe. The dotted lines *Q Q Q* show how this may be done. The branches of the return correspond to the steam pipes and pitch the same way. A 2-inch pipe, corresponding to the 4-inch, will do, and 1¼ to the 2-inch cross branches. A direct return trap would be the best under most circumstances, but with a pressure of 3 pounds we think they cannot be worked with any surety. On the other hand, if a steam pump is used, it will have to be constructed with special reference to such low pressure and will not be automatic, giving an irregular feed. Increase the pressure and use a trap is probably what you will have to do.

The gross amount of surface in square feet should not be less than 2,250.

The detail of the work should be intrusted to some one who has had former experience, as your arrangement suggests a problem not often met with.]

COMPETITIONS.

To the Editor of THE SANITARY ENGINEER:

I noticed in a recent issue of THE SANITARY ENGINEER, under "Proposals," a notice of a competition for public buildings for some town in Texas, to cost $75,000, the successful competitor to receive $100. What talent can be secured to study out the conditions involved in designing such a building and to cost such a sum for a remuneration of $100? It is very evident that the committee having charge of this matter is ignorant of the amount of study and the time it takes to produce a plan meeting all the conditions and demands of a building of this description. It would be a most excellent question for you to treat on—the lack of appreciation evinced by most people towards the services of an architect. The anecdote in issue of Nov. 30 is a good illustration of the general comparison of builder and architect.

[We frequently allude to the ignorance of building committees in adopting such methods to secure professional advice and assistance. But in a community that has few expensive buildings, and where the people in charge of the carrying out of such work have had little experience as to the value of a good architect's services, or the possible expense that the blunders of an incompetent man may entail, such an estimate of the value of professional service is not to be wondered at.

If any men are foolish enough to waste their time in preparing plans, and we believe there will be plenty of them, they must not be surprised if the committee appropriate the good features of the rejected plans, and pay the $100 to some one who has a friend at court. We hear of men engaged in such committee work who are considered honest and reputable, yet such practices they see no impropriety in.]

DOUBLE GLAZING.

ST. PAUL, MINN., *Dec.* 9, 1882.

To the Editor of THE SANITARY ENGINEER:

In your number of February 16, 1882, there is an article on double glazing, by Gen. M. C. Meigs. I would like to ask him, or anybody who has had experience in double glazing, whether the glass does not, in time, become dirty, on the inside from accumulating dust? I remember seeing some cellar windows double-glazed, which had become so begrimed on the inside of the glass as to be opaque.

A double or storm sash is almost always used here, but double glazing, in some cases, would be preferable if there are no objections to it.

If you can secure the attention of Mr. Meigs, or others of experience, to this, you will oblige,

Yours, etc., CHAS. A. REED.

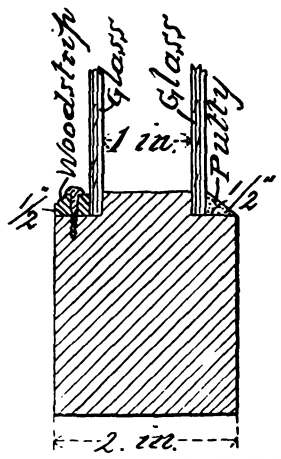
We referred this question to General Meigs, who makes the following reply.

WASHINGTON, D. C., *Dec.* 22, 1882.

To the Editor of THE SANITARY ENGINEER:

I return the question as to double glazing.

On July 22 I began to occupy a new office with four sash windows double-glazed; interval between glasses one inch. The outer glass is set in putty and is air-tight. The inner glass is fastened by strips of wood bradded on the sash rails. This joint is not air-tight, and is not the



proper joint. I yielded my own judgment to the carpenter's advice, thinking, also, that in case of need, I could more readily take out the inner glass for cleaning. Thus far this has not been necessary, and I can see no obscuration of the glass. Glass over water-color paintings stands for years without removal for cleaning. I believe that if both glasses are well secured in putty no change could take place in the interior surfaces.

While on this subject I add a few observations of temperature, tending to show the value of double glazing.

Observation of temperatures in office room, No. 1316 N Street, N. W., Washington. Four windows double-glazed. Interval between glasses, one inch. Thermometer in middle of space between glasses.

Thermometer A on inside of wall by north window.

Thermometer B, between glasses in middle of lower pane, same window.

Thermometer C, on outside shutter.

Room: Interior dimensions 29 ft. x 24 ft. x 13 ft. Brick walls, wooden floor and ceiling, cellar below, and a room above; two outside doors and four windows; source of heat, open fire-place, wood fire.

Dec. 8, 1882, 5 P. M., Fahrenheit Thermometers, A, 56°, B, 38°, C, 19°.

The mean between outside and inside is 37½°.

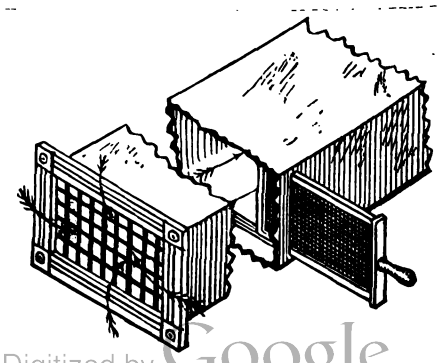
All observations made during the season are consistent with these. Thermometer B never differs more than ½° from the mean. M. C. MEIGS.

SCREEN FOR COLD AIR BOX.

To the Editor of THE SANITARY ENGINEER:

NEW YORK, *Dec.* 12, 1882.

Please tell us how to filter the air as it passes through cold air box of heater, so as to exclude the dust without



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too much obstruction to the flow of air? You may have published something upon the subject; if so, please refer me to the same. Yours respectfully, T.

[A sliding screen to be inserted in the cold air box of the furnace is shown in the issue of THE SANITARY ENGINEER of February 16, 1882. For the information of readers who have not that issue we illustrate a box and screen on the preceding page.]

A SEWER ORDINANCE.

To the Editor of THE SANITARY ENGINEER:

Not finding a sewer ordinance, such as I wanted to recommend to the Sewer Commissioners of Keene, N. H., for adoption by their city council, I have drafted an ordidance to suit my own ideas, a copy of which I send, with the wish that you will point out in THE SANITARY ENGINEER, what would seem advisable to change, to make the whole safer, more complete or less stringent. Whether they will adopt such an ordinance is another matter, and calls up the question, How much and in what particulars could this ordinance be safely changed, so as to make it less expensive to the inhabitants of that city? For it will be on the grounds of expense that objection will be made. The subject of sewer assessments being so closely connected with this subject of regulating the house connections, I have made a draft of an ordinance on this subject also, a copy of which is added.

The system of sewerage now being put in at Keene is Col. Waring's, the Drainage Contruction Co., contractors, and we have charge of the inspection for the city. They are now closing the season's work, about six miles of sewer pipe 6" to 15" having been laid since October 1. This is about half of the whole plan. One more question, How can the advantage of Col. Waring's plan of having the house connections made without running traps (thus securing ventilation by means of the soil pipes, the air passing down some and up others (?) (I think he claims) be gained, without great danger of carrying the emanations from one house to another, unless (as has been suggested by Mr. E. W. Bowditch) a special ventilating pipe outside the house takes the place of the soil pipe as a ventilator of the sewers (Sec. 4, 2, first ordinance)? And still another: Many of the house-owners, where the house connections with the sewer are most needed, being poor people, what is the cheapest arrangement that it has been found advisable to permit them to use in connecting with the sewer?

I should not neglect to acknowledge valuable suggestions from W. H. Bradley, Superintendent of Sewers, Boston, and E. W. Bowditch, as well as THE SANITARY ENGINEER, in preparing these ordinances.

Hoping that you have a good stock of patience and time in reading this, I am, sir,

Respectfully yours, EDWARD P. ADAMS.

AN ORDINANCE TO REGULATE THE HOUSE DRAINAGE AND THE CONNECTIONS WITH THE PUBLIC SEWERS.

Be it ordained, etc.

SECTION 1. That a Board of Health be chosen by the city council, to consist of three medical men, one member of the council, and a sanitary engineer, who shall be the Superintendent of Sewers. This Board shall have charge of all matters relating to the public health of the city.

SEC. 2. The Superintendent of Sewers shall have supervision of the construction and the repairs of all sewers and house drains, and shall keep a description with plans of the sewers and connections and an account of all expenses in his department.

SEC. 3. When the Board of Health shall deem any privy, cesspool or house drain to be a nuisance or a danger to the health of the inmates of the house or of others, they shall require the house to be drained and a connection with the public sewers to be made in accordance with the rules and regulations of this ordinance. And, in case of neglect to do this within two weeks' time from the receipt of the requisition of the Board, they may make such drains and connection at the owner's expense.

SEC. 4. The following regulations shall govern the planning of all house drainage and house connections with sewers.

1. For each building there shall be a separate connection with the public sewer of four-inch salt-glazed vitrified pipes, which may extend from the sewer to within five feet of the house; and from thence the house drain shall be four inch plain or enamelled heavy cast iron pipe or asphalt-coated wrought-iron pipe, and shall extend upward as a soil pipe above the highest part of the roof.

2. If the house drain runs under or through the house, a running trap and air inlet should be provided between the house drain and the street, with a special ventilating pipe, four inches in diameter, of cast iron, on the sewer side of running trap, extending above the highest part of the roof.

3. Every fixture shall be effectually trapped and every trap ventilated into a ventilating pipe not less than two inches in diameter and with joints air-tight, which shall connect with the soil pipe or the open air above the highest trap. Every sink drain pipe shall have a good grease trap.

4. No privy or cesspool shall be connected with the house drain or sewer. When water closets take their place, they shall be thoroughly cleaned out and filled with fresh dry earth.

5. No sub-soil drain shall be connected with house drain except at fresh air inlet, with provision for preventing the entrance of rats as well as sewer gas. Drip or safe pipes and rain water conductors should not be connected with the house drain, but empty into the open air.

6. Every water closet shall be of the hopper form (no pan closets allowed), adequately flushed with water from a cistern above it. Each water closet apartment should have a direct means of ventilation into the open air.

7. The arrangement of soil and waste pipes shall be as direct as possible, and the drain, soil and waste pipes, and the traps shall be left so that they may at all times be readily examined and repaired.

SEC. 5. All drain laying, repairs or connections shall be done according to the following rules, and if any drain be constructed or repaired or any excavation for that purpose, without a permit in writing from the Superintendent of Sewers, or in a mode different from that prescribed herein, the person doing such work and the owner or agent directing the same, shall respectively be liable to a penalty not exceeping twenty dollars.

RULES FOR DRAIN LAYING.

1. Before any connection with the public sewer is made or any house-drainage put in or any repairs on them, a permit must first be obtained and the plan proposed approved by the Board of Health. Permits when not used must be returned to the office of the Superintendent of sewers.

2. No pipes or other materials for the drains can be used till examined and approved by a duly authorized Inspector (appointed by the Superintendent of Sewers). All work must be inspected by him and done to his satisfaction.

3. At the time the permit is given to put in or to repair the house-drainage or the connection with the sewer, the applicant must fix the time for the Inspector to call. If, at the time appointed, the work to be inspected is not (in the judgment of the Inspector) likely to be ready within a reasonable time, the Inspector will not be obliged to wait, and the applicant must then make a new appointment at the office of the Superintendent of Sewers.

4. In opening any street or public way all the materials must be placed where they will cause the least practicable inconvenience to the public, and the whole enclosed with sufficient barriers and properly lighted at night from the beginning to the end of the work.

5. As little as possible of the trench must be dug until the Y-branch in the sewer is found. Whenever the sides of the trench will not stand perpendicular, sheeting and braces must be used to prevent caving.

6. The least inclination that can be allowed for house drains is one in sixty. When any change of direction is made in the pipe, either in a horizontal or vertical direction, curves must be used. No angles by clipping pipes or otherwise are allowed.

7. In the "house connection" every joint shall be laid with gasket and cement and bedded in hydraulic concrete at least four inches in depth. The house drain, soil pipe and special pipes must be calked with lead so as to be both water and air tight. Only wiped joints are allowed on lead pipes, and when a lead pipe is connected with an iron pipe, a special brass thimble with calked lead joint must be used.

8. The ends of all pipes not to be immediately connected are to be securely closed water tight with imperishable materials. The inside of every drain, after it is laid, must be left smooth and clean throughout its entire length, and true in line and grade.

9. The back filling over drains after they are laid must be puddled or rammed, all water or gas pipes protected from injury or settling, and the surface of the street made good, within forty-eight hours after the completion of that part of the drain lying within the public way.

SEC. 6. In case of neglect or refusal to remove, reconstruct, repair, alter or cleanse, any privy, cesspool, house-drain or house connection with sewer, for one week after the order or the Board of Health, they shall cause the same to be removed, reconstructed, repaired, altered or cleansed, at the expense of the owner, agent, occupant or other person, as the case may be; and he shall be liable to a penalty not exceeding fifty dollars.

AN ORDINANCE TO REGULATE SEWER ASSESSMENTS.

Be it ordained, etc., as follows:

SECTION 1. Every landowner whose property may be benefited by the building of any public sewer shall be assessed in proportion to the area of land so benefited, which benefit shall be considered to extend from the street line to a line 120 feet distant therefrom.

SEC. 2. Three-fourths of the cost of the public lateral sewers (six inches in diameter) and so much of the cost of the main sewers as shall be equal to the expense of constructing six-inch sewers of similar length along the same lines, including in both cases, the cost of connections from the sewer to the sidewalk line, shall thus be assessed. One-fourth of the above cost and the excess of the cost of main sewers shall be borne by the city.

SEC. 3. A map or maps showing the areas benefited by each main or lateral sewer shall be kept at the office of the Superintendent of Sewers, and all assessments shall be made in accordance therewith.

[So far as we can judge with our imperfect knowledge of your local circumstances the regulations appear all right. A clause, however, should be added giving the Board of Health power to modify or amend these rules as circumstances may require, and also to prescribe the conditions under which men can do plumbing work either as masters or journeymen. The question of the omission of the main trap rests entirely on the future successful working of your system. We have not sufficient knowledge of your conditions to justify us in giving an opinion.]

THE CHICAGO MASTER PLUMBERS.

(From our Special Correspondent.)

CHICAGO, *Dec.* 21, 1882.

The Master Plumbers' Association met this evening at No. 185 Clark street, Daniel J. Rock in the chair. The attendance was about 40. Andrew Young, in the paper of the evening, characterized the statement of a morning paper that 90 per cent. of the buildings of the city were unfit for habitation, owing to defective plumbing, as considerably exaggerated. He instanced several cases of butcher shops, recently unused saloons, from which the fixtures were taken away and the soil pipes left uncovered, the result being noisome air from open sewers. The City Hall, as well as the North Side County buildings, was in a bad condition. Referring to the inadequate means for flushing sewers, he gave a laughable description of the lumbering vans now in vogue, and advocated the sinking of artesian wells as the best substitute. As the water was strongly impregnated with sulphur, it would be valuable as a disinfectant. Speaking of food adulteration, he said bad plumbing could be remedied and broken sewers mended, but here was an evil that practically defied correction. The present Chicago Board of Health, for its inadequate force, did commendably, though practical plumbers should be represented on the staff. In closing, Mr. Young called attention to the terrible stenches too often emanating from stored food on certain produce thoroughfares. For his contribution the gentleman was unanimously thanked.

It was announced that Prof. Norman Williams, of the Northwestern University, would commence at the next meeting a series of sanitary lectures, under the auspices of the association, and all arrangements were referred to the Sanitary Committee.

Before the adjournment there was some discussion on the relation of the wholesale trade to the craft.

Architect Willett has yet to make up his mind as to the ventilation and sewerage defects at the north side county buildings where the vile stenches are credited with sending one judge to Florida and another to bed with pyæmia. Judges Williamson and Tuley, presiding in the criminal court this session, have again directed attention to the evil.

The latest action of the authorities is the appointment of Alex. W. Murray to investigate the whole sewerage and ventilation system of the buildings. Already he has found cesspools in close communication with ventilating shafts, and that four-fifths of the 212 cell waste pipes are untrapped.

The Board of Fire Commissioners of Jersey City have adopted a rule that all hotels, boarding-houses, schools, public buildings, factories and workshops, when they are three or more stories in height, must have external fire escapes. The penalty for failure to comply with the rule is a fine not to exceed $300.

The Grand Jury of the Kings County Court of Sessions have made a presentment, finding the old Raymond Street Jail, Brooklyn, to be a disgrace to the city and unfit for habitation by the lowest criminals. This jail affords a subject for Grand Jury comment, but apparently no notice it taken of the presentments. Perhaps when several more juries have had their say about it, something will be done.

The Academy of Science, at Rochester, N. Y., has organized a Hygienic Section, of which Dr. E. M. Moore is President, Anson C. Allen Vice-President, and Dr. Edward Angell Secretary. Lectures are to be given at the Society's hall twice a month.

The Engineers' Association of Rhode Island held a third anniversary celebration the 16th ult., with great success.

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Reviews of Books.

HOUSE DRAINAGE AND SANITARY PLUMBING. By WILLIAM PAUL GERHARD, Civil and Sanitary Engineer. D. Van Nostrand, Publisher: Science Series. Paper, 50 cents.

This little book contains substantially the paper prepared for the Rhode Island State Board of Health, which, at the time of its publication, was favorably noticed in these columns. It has since been rewritten and revised in various parts and published in Van Nostrand's *Magazine*. It presents in a readable and convenient form, information that every householder, physician and architect should be possessed of.

We are pleased to note an absence of sensational statements and unwarrantable conclusions. The author frankly states that his "subject has been well and thoroughly treated by able writers, and his paper can hardly claim much originality or novelty," yet he has succeeded in condensing in one volume much information hitherto more or less scattered.

The statement that "any one building a house is able to secure good drainage and a safe arrangement of the plumbing work without having to resort to any patented system" is in accord with what we have often told our readers (and we still hold to that opinion), yet, in the face of this statement the author has, in the most important illustration in the book, namely, a sectional drawing showing "system of house drainage" selected certain forms of patented traps to serve fixtures so located that it would have been entirely feasible and better to use the ordinary traps and properly ventilate them.

It is to be hoped that further experience will induce him to change this in a subsequent edition.

What is to prevent the syphonage of the trap under the bath tub when the water closet is emptied, which, by the way, is a kind that discharges some four gallons of water, is not apparent.

The other statements in the book are so much in accord with our opinions hitherto expressed and still entertained, that we regret that in this case a good compromise should have been substituted where no compromise was needed; with the exception of this one illustration we have noticed nothing that we would take exception to, and we gladly commend the book.

HEALTH AUTHORITIES AT HOME AND ABROAD.

REPORT OF THE COMMISSIONERS APPOINTED TO INQUIRE RESPECTING SMALL-POX AND FEVER HOSPITALS. London, 1882. XXXV. Pp. 414. Folio.

This instructive and valuable report is the work of a Commission appointed in November, 1881, to inquire respecting the nature, extent, and sufficiency of the hospital accommodation for small-pox and fever patients in London, the best methods of providing hospitals for this class of patients, and the conditions to be observed in regard to such hospitals so as to insure as far as possible the recovery of the patients and the protection of the public against contagion. The members of this commission were: Frederic, Baron Blachford; Sir James Paget; Sir Rutherford Alcock; Arthur Wellessley Peel; Edward Leigh Pemberton; John Broden Sanderson; Alfred Carpenter; William Henry Broadbent, and Jonathan Hutchinson, to whom was added as Secretary, Nathaniel Baker, Barrister-at-law.

The Commission accepts the conclusions of Mr. Power with regard to the effect of small-pox hospitals as centres of infection (see SANITARY ENGINEER, Oct. 19, 1882, p. 427), and estimates that the maximum number of small-pox patients to be provided for at one time is 2,700. About 2,200 of them can be safely sent several miles by land, and these should be cared for in hospitals situated in the country at a distance from London. There will remain four or five hundred cases too ill to be removed to any distance. Some of these might be treated in hospitals on or near the river Thames, and the rest be cared for in a few small hospitals of improved construction and management, in connection with the fever hospitals or elsewhere.

The Commission conclude that all evidence goes to show that well conducted fever hospitals involve no appreciable risk to the neighborhood, and that under proper precautions a limited number of small-pox cases (30 or 40) may, without sensible risk of infection, be received within the precincts of a fever hospital.

They think "That every person suffering from an infectious disease, or those in charge of him, or if these neglect their duty, the occupier of the house in which the sick person is residing, or, if he is a pauper, his medical attendant, should be required by law to notify the nature of the disease to the medical officer of health so soon as they or any of them are aware of it; and that in the case of non-paupers, the medical attendant should, if it is inexpedient to impose any further obligation on him, be similarly required by law to furnish the sick person, or those in charge of him, with a certificate of the nature of the disease in the form which we have already suggested, to be by them communicated to the medical officer of health. On every certificate so communicated a small fee should be paid to the medical man who signed it." It will be seen that this is in substantial accord with the views heretofore expressed by THE SANITARY ENGINEER with regard to the compulsory notification of infectious disease.

It is recommended that the provision of hospital accommodation for persons suffering from infectious disease in the metropolitan districts should be entirely disconnected from the administration of the poor law, and placed under one central authority. That this is wise there can be no doubt. They advise that the power of arresting the operations of the hospital authorities by injunction should be taken away. "It is incompatible with the public safety that individuals should possess the power of suddenly paralyzing institutions which furnish for the time the only machinery of controlling an epidemic." Did space permit we should be glad to quote further from this report, which is one that does not permit of condensation, and is characterized by clear practical good sense The minutes of evidence taken, with various appended documents which accompany the report, contain a vast amount of interesting matter, and the whole forms a volume which every one who is specially interested in the problems of dealing with infectious disease in a large city should possess.

FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF ILLINOIS. (For the year 1881). XXXII., 213 pp. 8 vo. Springfield, Ill., 1882.

The greater part of the work of the State Board of Health of Illinois is connected with the enforcement of what is known as the Medical Practice Act, and this, as the Board remarks, "with the limited means and clerical force at its disposal, have hitherto precluded as much attention being given to some forms of purely sanitary works as is deemed desirable." Nevertheless, the Board has done important work during the year with reference to small-pox, in part by its coöperation with the National Board in securing the inspection and vaccination of unprotected immigrants, in part by its requirement that on and after January 1, 1882, no pupil shall be admitted to any public school in the State without presenting satisfactory evidence of proper and successful vaccination, the result of which order will appear in the next report.

For the twelve months preceding the establishment of the immigrant inspection service it is stated that "it had cost municipalities and citizens of Illinois not less than $100,000 to care for outbreaks of small-pox directly caused by these unprotected immigrants. This is the actual money cost, and does not include the constructive cost of injury to business, loss of time, etc. Since the beginning of these inspections there has not been a single outbreak in the State due to immigrants, and only one case among the immigrants themselves." The Board has the right to refer to this matter with self-satisfaction for this result, and indeed the organization of the service itself is mainly due to the energy of its secretary, Dr. John H. Rauch, who has acted for the National Board as Supervising Inspector of the Western District, and the publication of whose monthly reports has had an excellent effect on the work done by the steamship companies. This Report also contains the proceedings of the Sanitary Consul of the Mississippi Valley, which we are glad to see thus recorded and preserved.

The total expenditures of the Board for all purposes during the fiscal year, were $5,754.25, and it is evident that the money was well spent. The Board is to be congratulated on the results it has achieved, and it is to be hoped that it will soon be able to devote more of its time and energy to the strictly sanitary interests of the State, while not relaxing in any way in the good work which it is doing under the Medical Practice Act.

NINTH ANNUAL REPORT OF THE SECRETARY OF THE STATE BOARD OF HEALTH OF THE STATE OF MICHIGAN, for the fiscal year ending Sept. 30, 1881. LXII., 501 pp. 8vo.

This large volume represents a vast amount of work. On the title page we are met by a new device for a seal for a sanitary body, being a doorway in a wall. The keystone of the arch of this doorway is labelled Vital Statistics, and the stone at the threshold is Truth. At first we thought that the door was open and that the arms of the State of Michigan were to be seen through it, floating in a cloudless sky. Closer examination, however, showed that the door was shut, but the indication of a few planks on it would be an improvement, and still better would be a curtain in its place—the veil of Iris. The first part of the volume is occupied with the report of the Secretary, Dr. H. B. Baker, relative to the work of the Board. The second part includes papers and addresses presented at sanitary conventions held at Flint and Battle Creek, and eighteen papers and reports prepared for the Board. Among these we would specially commend a paper on the Systematic Study of Causes of Sickness and Death, by Dr. Baker; one on Nostrums, by Prof. A. B. Prescott, of the University of Michigan, and one on Sanitary Rules *versus* Medical Theories, by Dr. Foster Pratt, of Kalamazoo. Dr. Baker truly remarks that popular books and articles are not usually "contributions of science" and that really valuable contributions to science are not commonly easy and pleasant reading. He illustrates the relative prevalence of certain diseases in Michigan at different seasons of the year by some effective diagrams, and points out some deductions from the vital statistics of the State. For instance, diseases of the lungs cause nearly one-fifth of all the deaths reported, probably 2,000 dying each year from consumption; and there are twice as many deaths from whooping cough as from small-pox. The contrasts between intermittent and typhoid fever as to season of prevalence are well shown in diagram 3. Prof. Prescott gives the composition of some of the numerous nostrums on the market, such as pain killers, ague cures, etc., showing that they are either worthless or are common prescriptions sold at a hundred times their cost.

Dr. Pratt gives a graphic description of the results of attempting to enforce the law which was designed to make the reporting of cases of diphtheria compulsory, and concludes that it is necessary that the law should specify by name the diseases to which it is intended to apply.

The paper on the Relation of Preventable Sickness to Taxation, by Dr. J. H. Kellogg, of Battle Creek, presents the subject of sanitation in a business point of view. He concludes that the annual loss to the State of Michigan from preventable diseases is over six millions of dollars, and that it may amount to ten millions.

The last hundred and sixty-six pages of the volume are filled with a compilation of the weekly reports of correspondents of the Board, and with a report on the principal Meteorological Conditions in Michigan during the year. These have been compiled by the Secretary, who has given a great amount of labor to their compilation and analysis. The volume is one that is creditable to the Secretary and the Board, and we commend it to all who are interested in State sanitary work.

ROCHESTER, N. Y., ANNUAL REPORT OF THE EXECUTIVE BOARD, for the year ending April 3, 1882.

The Water Works, Streets, and Fire Departments of Rochester are in charge of a Board of three citizens, one of whom is elected by popular vote each year. Their annual report, embracing the detailed reports of the several departments and many statistical tables, makes a pamphlet of 92 pages.

The report of the Board itself is concise and businesslike, with a little tendency, however, to "fine writing" and the use of too many adjectives, such as, "magnificent," "splendid" "unequalled," and of course "our fair city" and the "fire fiend" are brought in. Such stuff is out of place in business documents and makes them ridiculous.

The report of Mr. Tubbs, the Chief Engineer of the water works, is clear and satisfactory in most respects. There are some serious omissions, however.

The average daily consumption for the year is given, but not the variations during the different months of the year. This is always interesting and instructive, as showing how the waste increases in the very cold weather. The number of taps or connections is not given. This ought always to be stated in a report, and in this respect the Louisville report, which we noticed a few days ago, is a model. It gives a tabular statement of the number and sizes of taps in the mains.

The number of meters is not given, nor the proportion of the water used that is metered. No record is given of the work of the pumping engines on the direct-supply system. This omission might lead some captious critic to

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doubt whether that "adjunct" to the water works is as great as it has been claimed to be, especially as in the fire department report it appears that out of 64 fires extinguished by water, the direct pumping works put out 17 without other aid than chemical extinguishers and the gravity works put out 44 unaided except by extinguishers.

Eight pages are occupied with a table of the exact location of the stop cocks on the main pipes, but no table is given of the location of the hydrants. This is a little odd, for no one but employés of the works have occasion to know where the stop cocks are; but many citizens, and particularly the firemen, like to know the location of fire hydrants.

The report of Mr. Peacock, the City Surveyor, gives good statistics of the extent and condition of the streets and sewers. There are 205.71 miles of open streets in the city, of which 49.81 miles are paved with Medina stone, Telford-Macadam, cobble-stones, gravel and wood. These are named in what Mr. Peacock considers the order of their usefulness and value. There are 87¼ miles of sewers, of the sizes and location of which a detailed table is given. Some of the sewers, east of the Genesee River, which runs through the city, empty into open ditches leading to Irondequoit Bay on Lake Ontario. The construction of an intercepting sewer which will convey this sewage to the Genesee River, is recommended. Such a sewer would enable 16 miles of open ditches to be abandoned.

There is no index or table of contents to the report.

"What is expert testimony and who are experts?" is the title of a paper read before the New York Medico-Legal Society on the evening of Dec. 6, by O. W. Wight, M.D., Attorney and Counselor at Law. Dr. Wight is well known as an energetic health officer, and being both a lawyer and a doctor, has the advantage over those who have studied but one of these professions. His paper is rather legal than medical, and contains some rather sharp remarks about medical experts, with regard to whom he seems inclined to agree with the remarks made by Judge Davis, of Maine, *i. e.*, "If there is any kind of testimony that is not only of no value, but even worse than that, it is, in my judgment, that of medical experts." If for "medical experts," in the last clause, we substitute the words, "the majority of those who present themselves as medical experts," the opinion would be sound.

The greater part of Dr. Wight's paper is devoted to the discussion of expert testimony in cases of insanity, but some of his conclusions apply equally well to expert testimony in sanitary matters; such, for instance, as was given in the recent malaria trial in Massachusetts.

The fundamental difficulty in the matter is, who is to decide as to who are really experts? So long as it is left to the parties in a suit to decide this matter, so long the trouble will continue. When this responsibility is placed directly and exclusively on the judge, and the expert is considered to be the adviser of the court, and not the attorney for the plaintiff or defendant, matters will rapidly mend. The paper is an interesting one to both physicians and lawyers, which was what was to be expected of its author.

Vick's *Floral Guide*, for 1883, brought out this year by the sons of Mr. Vick, fulfills the desire of its founder, lately deceased, "to have each succeeding edition superior to the preceding one." It presents several finely-colored plates of flowers and vegetables with full catalogues and information on the subject.

MANAGEMENT OF INFECTIOUS DISEASES.

The report of the Royal Commissioners appointed to inquire respecting small-pox and fever hospitals in London, recently issued, contains the following practical remarks as to the management of infectious diseases:

"Upon one cardinal point the evidence which we have received is almost absolutely unanimous. On the outbreak of an infectious disease the first imperative necessity is to isolate every case immediately and effectually as it arises. On the one hand, such isolation with its incidents almost invariably answers its purpose. We are told with confidence that when in the earliest stage of such a disease the patient is removed to a hospital, the house, its contents, and the adjacent drainage disinfected, and, in the case of small-pox, the neighbors re-vaccinated, no further apprehension need be felt on the score of that house. When this precaution is neglected, the contrary result follows. In one instance 20 cases of small-pox, in another 25, in another 23, in another 16 deaths, and 20 cases were distinctly traced to one case of concealment, and the consequent absence of isolation and disinfection. Each freshly infected house tends, if neglected, to become a new source of contagion, and the whole to swell into an uncontrollable mass of disease." * * *

"We are of opinion that the provision of hospital accommodation for persons suffering from infectious disease in the metropolitan districts should be entirely disconnected from the administration of the Poor Law, and treated as part of the sanitary arrangements of the metropolis. We think that the conduct of the hospitals cannot be better placed than under the management of the Metropolitan Asylum Board, with such changes in their mode of election as shall give the sanitary authorities in London—that is to say, the vestries, district boards, and commissioners of sewers—at least an equal influence with the guardians of the poor in the choice of the elective members of the board. We think that every person suffering from an infectious disease, or those in charge of him, or, if these neglect their duty, the occupier of the house in which the sick person is residing, or if he is a pauper, his medical attendant, should be required by law to notify the nature of the disease to the medical officer of health so soon as they or any of them are aware of it; and that, in the case of non-paupers, the medical attendant should, if it is inexpedient to impose any further obligation on him, be similarly required by law to furnish the sick person, or those in charge of him, with a certificate of the nature of the disease, in the form which we have already suggested to be by them communicated to the medical officer of health. On every certificate so communicated a small fee should be paid to the medical man who signed it. If the medical officer after receiving such a certificate is satisfied that the patient can and will be properly isolated, and requisite means of disinfection adopted, the matter will proceed no further. If he is not so satisfied, and if the sick person is not too ill to be removed, he will notify the case to the Metropolitan Asylums Board; who will thereupon be at once and entirely charged with the patient till his complete recovery, and, in particular, will be empowered to remove him at once to one of their hospitals. So far no distinction should be made between paupers and non-paupers who cannot be isolated. But within the hospital those who are desirous of being placed in separate wards should be allowed such accommodation on paying for it. In case of ordinary accommodation, it appears to us a question whether payment should be claimed even from those who can make payment without difficulty. If the sick person cannot be removed or isolated by those about him, the medical officer will be bound to take all necessary steps for his isolation, and generally for the protection of the neighborhood, with power to clear the house of its inmates. In all cases he will be bound to disinfect the house, and in case of houses invaded by small-pox, should be empowered to require the re-vaccination of all occupants who are not otherwise protected. We are led by the concurrent evidence of several experienced witnesses to hope that the immediate and complete isolation which ought to be secured by these means will greatly diminish the amount of small-pox, scarlet fever, and typhus in London. With regard to these, and also to typhoid, still further diminution may be anticipated if the attention of the proper authorities is directed to the removal of all local cause of disease, and to the constant employment of means of disinfection. And we feel bound to repeat our conviction that small-pox would be still further reduced if vaccination could be made more effectual and re-vaccination more frequent."

PLUMBING LAW VIOLATIONS.

No very serious violations were reported by the inspectors during the past week. Minor violations were reported as follows: by Inspector Hooper four, Hollick three, Elliot two and Golden one.

The death of C. V. Walker, President of the Society of Telegraph Engineers, is announced by cable from England.

Several milk producers were before the courts at Camden, N. J., last week on charges of adulterating their milk, preferred by Dr. N. R. Newton, State Milk Inspector.

An ordinance passed by the Cincinnati Aldermen, the 23d ult., devolves upon the Smoke Inspector, the duty of looking after fire escapes.

CINCINNATI'S WATER WORKS.

Cincinnati, Jan. 1.—The Water Works Company completed their improvement and turned on the water this afternoon. This improvement gives the city a capacity of 15,000,000 gallons every 24 hours.

In the second week of December there was great scarcity of water in North Eastern Pennsylvania. In Scranton the water company issued notices to consumers to be sparing in the use of water. All through Wayne, Susquehanna and Wyoming Counties wells and springs gave out and there was trouble getting a sufficient supply for stock watering and household use. It was due to the light rainfall and the severe cold weather coming on suddenly and early.

AWARD OF BIDS IN NEW YORK CITY.

NEW YORK.—The following bids were opened at the Department of Public Works on the 27th of December:

For furnishing and delivering stop cocks, stop-cock boxes and hydrants, as follows:

	Three 48-inch Stop Cocks and gearing.	Eight 36-inch Stop Cocks and gearing.	One 30-inch Stop Cock and gearing.	Ten 12-inch Stop Cocks and gearing.	Ten 6-inch Stop Cocks and gearing.	Ten No. 1 Stop Cock Boxes and Covers.	Ten B Hydrants.
Geo. H. Robinson	$2,785.00	$1,550.00	$1,020.00	$62.00	$29.75	$38.40	$83.00
Chas. C. Field	2,772.50	1,540.00	1,075.00	59.00	28.75	37.70	79.75
Julius Jonson & Co.	2,800.00	1,550.00	1,100.00	58.75	28.75	37.75	79.75

The award was made to Charles C. Field.

For furnishing, delivering and laying a 48-inch cast iron conduit pipe from Woodlawn station to the reservoir at Williamsbridge, and 36-inch cast iron pipe around the reservoir, and from the same to the Croton aqueduct and to Jerome Avenue.

Florence Iron Works	$310,277.00
James Baird	297,999.00
T. E. Cronnin	341,507.00
Frank Stollmeyer	319,906.00
Theo. Sturges	321,492 50

Awarded to James Baird.

For hauling and laying a 48-inch cast iron conduit pipe from Midland Avenue to Station 522, between Tuckahoe and Bronxville, Westchester Co., there were nine bids, of which the lowest was $37.052, by Frank Stollmeyer, to whom the contract was given.

For alteration and improvement to sewer in Fifth Avenue, between 59th and 60th Streets, the lowest bid was $2,160, by E. M. Lynch, but this will probably be rejected as informal, and the contract awarded to the next lowest bidder, J. Baird, whose price is $3,128.

The following contracts were awarded (to the lowest bidders) from proposals opened the same day (December 27):

For sewer in Beekman Street, between Water and South Streets, to P. Mulholland, for $2,225

For sewer in 135th Street, between Fifth and Seventh Avenues, to J. S. Masterson for $7,639.

For sewer in 135th Street, between Seventh Avenue and summit west of Seventh Avenue, to J. S. Masterson for $750.

For flagging sidewalks four feet wide on 98th Street, between Eighth and Ninth Avenues, to James Slattery, for $1,617.50.

On December 30, two bids for flagging sidewalks and setting curbstones on streets surrounding Fulton Market were opened. The lowest was $8,950, from P. Gallagher.

(For Construction Notes see page 106.)

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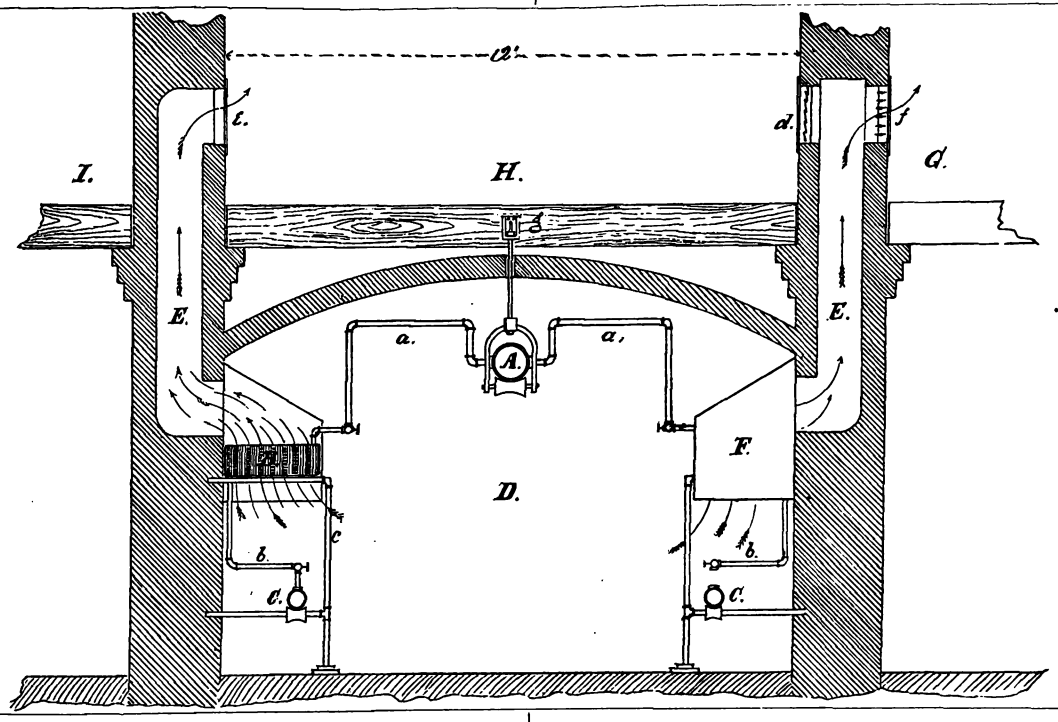
STEAM HEATING APPARATUS IN THE KALAMAZOO INSANE ASYLUM.

To the Editor of THE SANITARY ENGINEER:

Herewith I send you a detail of the radiator, etc., as planned by C. M. Wells, C. E , architect for the remodeling of the steam heating apparatus of both the male and female insane asylum, at Kalamazoo, Mich.

Originally the buildings were planned by Dr. Van Dusen, the medical superintendent at the time, and the heating apparatus was erected by Joseph Nason, of New York. The system then used was chamber heat; all the coils for each building were massed at the extreme end of an air duct, away from the main building, which connects with a passage *D*, shown in cut, and the air was forced by a fan driven by an engine, sending the warmed air through the plenum *D* and through the flue *E*, to the rooms and halls. In time it was found that though a fan could force air



sufficient for a whole building, and there was possibly enough pipe surface, yet, in windy weather, it was impossible to warm certain halls depending on the direction of the wind, the outside pressure forcing back the warm air. The management then, as a matter of experiment, added supplementary box coil and placed under the entrance to the flues *E*, which were found to require them most. The experiment proved satisfactory and gradually the engineer, under the direction of the medical superintendent, removed the original coils and distributed them throughout the plenum, and boxed them with wooden casings. In this condition (necessarily a patch work) the apparatus was used, the fan being still retained until the spring, 1881, when the Legislature voted money, at the request of Dr. Palmer, the present medical superintendent and the commissioner for the entire remodeling of the apparatus on the same principle with regard to the disposition of the heating surface, and in respect to piping adopted the low pressure gravity system, still retaining the fan, though not always having to use it, as each flue has its separate heater with the new system.

The diagram is a cross section of the passages under the buildings with a total length of about 2,200 feet. *A*, is the main steam pipe hung on expansion hangers which are adjusted by a nut in the bracket *G*; *a*, *a*, the steam connection to radiator, and are purposely elbowed up and down as shown, to compensate for the expansion of the main; *B* is a radiator of the cast iron extended surface pattern (much liked by the engineers) and *b*, *b*, are the return water connections to the main returns *C*, *C*. The object in having two main return pipes is to prevent the too frequent crossing of the passage with small pipes; *F* is a galvanized iron coil casing or hood, arranged to be taken off for cleaning or repairs and is open at the bottom as shown by the arrows.

With this method there has been no trouble to get a uniform heat throughout the buildings, each flue doing its full duty independent of the others.

Not wishing to trespass on your time or appear tedious,

I am respectfully yours, "T."

N. B.—The successors of Joseph Nason, the Nason M'f'g Co., were the contractors for the new work.

Construction Notes.

We shall always be glad to receive items of interest for this column.

WATERBURY, CT.—The authorities are busy preparing plans for the proposed sewerage works. It is now expected that bids will be advertised for in February.

ALLEGHENY, PA.—Proposals for the construction of one or more pumping engines, with all necessary masonry and pump house, will be received by James Brown, Comptroller, until January 15.

BOSTON.—The new Children's Hospital, on Huntington avenue, is now completed and was opened to visitors Dec. 20. Its cost is $125,000; the architects are Messrs. Winslow & Wetherell and N. J. Bradler.

BOSTON.—The Boston Park Commissioners having obtained the necessary legislation preliminary to the conversion of Muddy River into a charming parkway, so to speak, after the plans prepared by Mr. Fred. Law Olmsted, ask the city government for an appropriation of $400,000 to execute the improvement. The sanitary condition of this stream, which is now nothing but a filthy sewage receptacle between Boston and Brookline, is so bad that prompt action ought to be taken in the matter.

The pond in the Public Garden in Boston is also in bad condition. The water is offensive at times both to sight and smell. Mr. Wightman, the City Engineer, thinks the trouble is due to the mingling of fresh and salt water in the pond. The bottom is firm gravel, with a few deep holes. Mr. Wightman recommended that these holes be filled with clean gravel and the bottom covered with 3 inches of Portland cement concrete. The gravelling would cost $5,000 and the concreting $13,000 more, so the Aldermen split the difference and appropriated $10,000 for the work.

SAN FRANCISCO.—The supervisors of San Francisco, Cal., have at length adopted an ordinance fixing rates which the city must pay the Spring Valley Water Co., for water used for public purposes. This result was only brought about under pressure of a judicial mandate. The supervisors wanted the company to furnish water free of cost. This the company naturally were unwilling to do, and Mr Charles Webb Howard, the energetic President of the company, prepared at great labor and expense, statements showing that in all the large cities of the country, the property owners as independent of the water consumers contributed a liberal share of the cost of the water works, and he maintained that is was but just that property should be taxed for the benefits it received from a water supply, in increased valuation and reduction of rates of insurance. The Supreme Court of California decided that this view of the case was correct and ordered the supervisors to pass the requisite ordinance.

MONTREAL.—The sewerage of the suburbs of Montreal is expected to be discussed vigorously at the coming session of the Provincial Legislature. Last year the bill proposed was defeated, owing to the opposition of the Montreal aldermen to permitting the suburban sewerage to pass through the city sewers. This is carrying out the "separate system" with a vengeance.

ALBANY, N. Y.—Bids were opened December 28, at the Treasury Department, for furnishing all the plate, double-thick sheet; double-thick sheet, ground cathedral and enamelled sheet glass for the Post Office:

Bidders.	*Amount.*	*Deduct'ns For Free Duty on Foreign Glass.*	*Time.*
*De Pauw Plate Glass Co.	2,975.00	.....	30 days.
E. A. Boyd & Sons	3,006.00	2,232.35	.....
Wm. Glenny & Co.	3,260.00	.....	6 weeks.
D. H. Fonda & Co., Albany, N. Y.	3,487.00	2,538.00	10 "
Simon Bache & Co.	3,593.50	2,565.00	10 "
Wm. Dey Erman & Co.	3,713.73	3,500.83 / 2 553.69	3 "
Holbrook Bros.	3,688.95	.....	.....
London and Manchester P. G. Co.	3,281.50	2,333.50	3 "
Hervy & Marriner	3,342.00	2,392,00	6 "

* Award will be made to De Pauw Plate Glass Co.

NORFOLK HARBOR.—Abstract of proposals received for dredging at Norfolk Harbor, Va., December 22, 1882:

Name and Address.	*Time Commence.*	*Time Complete.*	*Daily Am't of Work Expected cu. yds.*	*Price per cu. yd.*
Morris & Cummings Dredge Co., Norfolk, Va.	Jun. 10, '83	.....	.....	17 5-10c.
Geo. C. Fobes, Baltimore, Md.	Feb. 1, '83	Nov 30, '83	.....	17⅜c.
*Potomac Dredge Co., Washington, D. C.	.....	.....	.....	14c.
Moore & Wright, Portland, Me.	Feb. 1, '83	Nov 30, '83	.....	18c.
†R. G. Packard, Pres. Atlantic Dredging Co., B'klyn, N.Y.	.....	.....	.....	17c.
F. B. Cotton, Gen'l Manager Nat. Dred. Co., Wil'gt'n, Del	Jan. 15, '83	Nov 30, '83	.....	16 9-10c.

* Proposal not in accordance with the specifications.

† Bid made on condition that towing can be done any time, night or day, when tides and weather would permit.

ARCHER'S HOPE RIVER, VA.—Abstract of proposals received for dredging at Archer's Hope River, Va., and opened on December 22, 1882.

Name and Address.	*Time Commence.*	*Time Complete.*	*Daily Am't of Work Expected cu. yds.*	*Price per cu. yd.*
James Caler & Son, Norfolk, Va	Ap'l 1, '83	Jun. 30, '83	....	27½c.
Potomac Dred. Co., Wash'n, D. C	At Once	as sp'cifi'd	400	30c.
Geo. E. Ward, Alexander, Va.	Ap'l 1, '83	Jun. 30, '83	300	28 9-10c.
Joseph Baker, Norfolk, Va.	.....	Jun. 30, '83	....	37½c.

CHICAGO.—The building of the Electric Light Company's tunnels progresses in good earnest at 39th street and Wentworth avenue, one hundred men being employed.

NEW YORK.—The time for receiving proposals for cleaning the streets has been extended to Jan. 15.

SOUTH NORWALK, CT.—Proposals for constructing an iron swing bridge over the Norwalk River should be addressed to E. Hill, South Norwalk, or to A. B. Hill, the engineer, New Haven, Ct. Bids will be opened Jan. 31.

PORTSMOUTH, VA.—Water works are contemplated for the cities of Portsmouth and Gosport, Va., opposite Norfolk. The supply is obtained from the "Dismal Swamp," which, contrary to anticipation, is of excellent quality and abundant in amount. The conduit will be 6½ miles and the distribution pipes ten miles long. As the entire country is almost a level no gravity supply is possible, and direct pumping will be resorted to.

PHILADELPHIA.—Bids for supplies for the water works were opened Dec. 27. Among them were the following of interest to our readers: American pig lead, Tatham Bros. at $4 94 per 100 lbs., the only bid; cast iron service pipe, Gloucester Iron Works, $1\frac{9.8}{100}$ cents per pound, special pipe castings, $2\frac{7.5}{100}$ cents per pound, Millert Foundry Co.; $1\frac{6}{10}$ cents for cast iron service pipe and three cents for special pipe castings; brass castings, F. J. Clamer, 18 cents per pound, yellow brass castings, 22 cents per pound (the only bids). David S. Crosswell put in the only bid for shop castings and specialties in piping at $2\frac{8}{10}$ cents per pound.

CHICAGO.—Mayor Harrison of Chicago, speaks approvingly of his conduct of the city government during the past year. Regarding street pavements his statements are as follows:

"More streets have been paved during the past year than ever before during any one in the city. The greater portion of these have been laid with cedar block, although

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the city is progressing toward a more permanent pavement. During the year the first pavement of granite blocks was laid on Monroe street, between State street and Wabash avenue. As this is a new pavement in Chicago, it may be well to briefly state the manner in which it is laid. The street is first rolled with a sixteen-ton steam-roller and then covered with four inches of macadam limestone and again rolled. It is then covered with a two-inch layer of gravel in which the granite blocks are imbedded. The interstices between the blocks are filled with dry lake-shore gravel mixed with asphalt cement, thus making it impervious to the water. This is now considered the best known pavement for the business portion of a city. The cost is four dollars per square yard, and it is claimed that it will never wear out. Another pavement that has practically been introduced this year in the asphalt block pavement that has been laid on Wabash avenue. The pavement being a new venture, the department, in order to test it thoroughly, provided that the contractor should keep it in repair for five years after the completion of the work. This pavement costs $3.03 per square yard. Still another pavement that has been introduced is the sheet asphalt, which is laid on the macadam pavement without the blocks. A portion of Park avenue has been paved with it, and it has been used extensively in Washington city. All of the alleys in the business portion of the city have been paved with the Medina stone block on a foundation of gravel, at a cost of $3.50 per square yard, Another improvement is the changing of the catch-basin from the intersection of street corners to the curbstone on a line with the buildings."

During the year 1882 Chicago has laid nearly 20 miles of new water mains, making the total in use 514 miles or about the same as there are in New York city. The daily consumption is nearly 70,000,000 gallons.

HALIFAX.—Mr. E. H. Keating, M. Am. Soc. C. E., the City Engineer of Halifax, N. S., is on a tour of inspection under orders from the City Council to visit various seaports on the Atlantic coast to examine the dry docks and report on the advisability and cost of a dry dock at Halifax.

Insurance Society says that prominent business men are agitating for the erection of new water works in Brantford, Ontario, in order to obtain a supply for household purposes. The springs to the north of the city, and Blue Lake, nine miles distant, are urged as sources of supply. The sanitary condition of the city is far from satisfactory, and those best versed in the matter are most fearful of the results, unless remedial measures are adopted.

In a suit in Cincinnati for the vacation of an assessment for a sewer, Judge Harmon decided that as the cost of the sheeting and shoring, amounting to one-eighth of the cost of the work, had not been let by advertising for bids, the whole assessment was invalidated.

A contractor, in Philadelphia, bid on a sewer at so much a foot, basing his figures on a profile exhibited by the State Department, which indicated the material to be encountered in the excavation as gravel. In excavating the trench a considerable amount of solid rock, requiring blasting, was encountered. The Comptroller refused to pay any extra price for this, and the contractor sued and recovered judgment against the city for $470.88, being 50 cents per cubic yard on the rock excavated. The decision was based on the representations of the profile. The moral to engineers is, be careful what you show on your plans and profiles. It is best and fairest to all parties to make preliminary test pits or borings. In the absence of these, make no statements as to character of unseen materials, but provide specially that all unseen is at the contractor's risk.

(For Award of Bids in N. Y. City see page 105.)

PHILADELPHIA SEWERAGE.

Mr. Russell Thayer, the Superintendent of Fairmount Park in Philadelphia, has submitted to the Park Commissioners a report on the nuisance created in the Schuylkill River opposite the Park by the pollution of Dobson's Run, a small stream which enters the river at that point.

Two small brooks, each about three-quarters of a mile long, unite one and three-quarter miles from the river, and form Dobson's Run. Near their confluence the stream is dammed for manufacturing purposes by the Messrs. Dobson. Above the dam the water is not polluted. Below the mill it is discolored by dyestuffs, principally logwood, and receives the sewage of a number of houses on its banks. It is also stated that "washings" from Dobson's mills pollute the water, but as the nature of the operations carried on in the mills is not given in the report, no opinion can be formed as to the nature or extent of this pollution. The sewage of the operatives at the mills is not allowed to enter the stream. The débris brought down by the stream in freshets has formed a bar at its mouth, which, during seasons of low water, presents an unsightly appearance. Whether this deposit is also offensive to smell, Mr. Thayer's report does not state.

He suggests as possible means of preventing future inconvenience from this polluted stream six projects. These are: (1) An intercepting sewer on the east bank of the Schuylkill, to carry off the ordinary flow of Dobson's Run to below the Fairmount Dam, with storm overflows into the river. (2.) A sewer or canal on the west side of the river, the water of Dobson's Run being convyeed to it by a submerged syphon. (3.) A short intercepting sewer on the east bank, from which the sewage might be pumped into the system of sewers which discharge into the Delaware River. (4.) The separation and purification of the Dobson's Run sewage. (5.) The construction of an intercepting sewer on the east bank, as in the first plan, but carried further down stream, so as to prevent the possibility of the flux and reflux of the sewage with the tide in front of the city; and (6.) The absolute exclusion of all polluting matter from Dobson's Run. No estimates of cost are given, but the recommendation is made that surveys and examinations be ordered which will make the preparation of intelligent estimates possible.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Baxter st, w s, 54 s Walker st, 2 br dwel; cost $6,000 and $5,000; o, John Hooper; a, John Brandt....313 and 315 w, 41st st; 6 br storage; cost $15,000; o, E. J. Hayes; a, T. G. Smith....47th st n, 200 w 8th av, 1 br storage; cost $35,000; o, John R. Thurber; a, J. M. Dunn; b, L. N. Crow and McGuire & Sloan....7th av, w s, 50.2 n 53d st, 1 br storage; cost $32,000; o, Wm. H. Gray; a, J. M. Dunn....86th st, n s, 150 e Av A, br ten; cost $18,000; o, John H. Sturk; a, J. C. Burne ....76th st, s s, 105 w 2d av, 2 br ten; cost $16,500 ea; o, John MacDonald; a, J. Brandt....10th av, w s, 50 n 158th st, 1 br store and dwel; cost $6,000; o, William Deppermann; a, Julius Boekell ... Madison av, w s, 150 s 174th st, 1 dwel; cost $5,000; o, a and b, R. S. Guernsey; c, V. E. Farra.

BROOKLYN.

Park av, s s, 215 e Nostrand av, 7 fr dwel; cost $2,500; o and b, Julius Hommel; a, T. F. Thomas ...156 India st, 1 fr ten; cost $3,500; o, Clarkson, Warren & Co.; a, W. Wright; b, G. W. Philips....Dean st, s s, 200 e Washington av, 2 fr ten; cost, ea, $4,000; o, Thomas Monahan; a, I. D. Reynolds....Macon st, n s, abt 250 w Reid av, 6 br st dwel; cost, ea, $4,500; o, Henry A. Foster; a, J. E. Styles.

ALTERATIONS, NEW YORK CITY.

44 14th st, e, cost $6,500; o, Wheeler & Wilson M'f'g Co.; a and b, Monk & Brouwer....64th st, s s, 244 w av A, remove building; cost $2,500; o, John D. Crimmins... 3d st, No. 1 w, raised 1 story; cost $3,000; o, E. P. Dickie; a, C. E. Hadden....252 Bowery, front of 1st and 2nd stories, altered iron work; o, Samuel B. Duryea; a, A. Craig; b, Drummond & Jones.

BOSTON, MASS.—Notre Dame, nr Bragdon sts, two fr dwel; o, John P. Michaels....Rutledge, opp Wren st, one fr dwel; o, Horace Farrington; b, U. S. Mitchell... Boston, cor Blake st, one fr dwel; o, Mrs. Annie Foyer; b, Alex. M. Foyer....East 1st st, opp O st, two fr storage; o and b, Geo. Lawley & Son....Maxwell, nr Capen st, one fr dwel; o, Elmira E. Gipson .. Arcadia, near Adams st, one fr dwel; o, C. H. Whetmore; b, Wm. Codey.

BUFFALO, N. Y.—Linwood av, fr dwel; cost $8,000; o, Louis Knapp; a, M. E. Beebe....Main nr Seneca st, exchange build; cost $60,000; o, Austin Estate; a, M. E. Beebe....Linwood av, br and fr dwel; cost $12,000; o, Jas. Holmwood; a, E. L. Holmes ....Linwood av, cor Bryant, br and fr dwel; cost $18,000; o, A. J. Wright; a, E. L. Holmes....College st, two cottages; cost ea 2,200; o, C. J. Hamlin; a, F. W. Caulkins & Co. ..Huron st, Nos. 9, 11, and 13, blk of stores and French flats; cost $30,000; o, W. J. Sidway; a, Geo. J. Metzger.

DENVER, COL.—Lorimer st, add to br store; cost $5,000, o, W. H. Lessig....Kansas av, 2 br dwel; cost $5,000; o, W. J. Fay.

CHICAGO, ILL.—116 and 118 Illinois, br factory; cost $20,000; o, John V. Farwell; a, J. M. Vanosdel; b, by the day....3731-3735 Vincennes ave, br dwel; cost $10,000; o, F. D. Reynolds; a, L. C. Low; b, Chas. Piggers .. 168 Aberdeen st, br dwel; cost $8,000; o, E. S. Warren; a, R. Spalding....cor 29th st and Cottage Grove av, br dwel; cost $18,000; o, Willard F. Myrick; a, Cobb & Frost ....3633-3635 Dearborn st, br dwel; cost $8,000; o, Jno. Lauritzsen; a, Burnham & Root....S w cor Washington and State sts, s store alter; cost $25,000; o, W. E. Hale; a and b, E. Burling ... 324 Jackson st, br dwel; cost $5,000; o, Thos. Innes; a and b, Geo. Lehman ...Cor 35th st and Rhodes av, five brick stores and flats; cost $25,000; o, Barbara Titus; a, Dixon & Townsend; b, Geo. Lehman.

PHILADELPHIA, PA.—Chestnut av, e of Main; br dwel; b, Fourison Bros....Chancellor and St. James st, 15 br additions; o, S. T. Smaltz ...Delaware and Almond avs, br mill h, br filter h, add to retort h; o, H. Havermeyer & Co.

SIOUX CITY, IOWA.—Market st, bt 6th and 7th; 3 fr cottages; cost $1,000; o, M. J. Kearney....Douglas st, bet 12th and 13th sts; cost $1,200; o, W. C. Lyon ..Pierce st, bet Third and Fourth, br st; cost $3,000; o, Westcott and Pierce, a, A F. Cox, b, A. F. Cox.

READING, PA.—5th st 3 st br dwell; cost $8,000; o, Dr. Detweiler, a; Wm. A. Fink. .3d st and Court, 2 st b Engine House; cost $7,000; o, City of Reading, a, Wm. A. Fink....5th st, 3 br dwell, cost $5,000; o, H. Buck, a, Wm. A. Fink, b, J. Kline.....5th st, 3 st br hospital, cost $9,000; Reading Dispensary, a, Furness and Evans; b, S. Koch.

MILWAUKEE, WIS.—N w cor Park st and Sixth av, b add'n to factory; cost $7,000; o, Sanger, Rockwell & Co....N e cor Walnut st and Fond du Lac av, b bldg; cost $5,000; o, August Hasse... E side of 8th st, bet Sycamore and Clybourne sts. h dwell; cost $6,500; o; R. C. Notbohm; c, F. L. Vogle & Son....382 Milwaukee st, b add'n to store; cost $30,000; o, T. A. Chapman & Co; c, J. Graham & Son... s w cor Kewaunee and Marshall; two double fr dwell; cost $15,000; o, James Petley; a, Chas Ringer .. s e cor 2d and Sycamore sts, b factory; cost $5,000; o, Cream City Preserving Co.; c, McCann Bros; m, Mr. Klein...Brady st, n side nr Cass, two fr dwells; cost $5,000; o, Postman Denny... s w cor 2d and Fowler sts, new freight house; cost $50,000; o, Chicago Milwaukee & St. Paul R. R. Co....Hanover bet Railroad and Lapham sts, b dwell; cost $5,000; o, J. Campbell.

MISCELLANEOUS.

CINCINNATI.—Eastern av, nr Washington st, fr; cost $7,500; o and b. John Price.

TOLEDO, O.—Grain elevator corrugated iron; cost $225,000; o, Union Elevator Co; a and b, J. A. McLennan.

DETROIT, MICH.—Grain elevator, corrugated iron; cost $300,000; o, Union Depot Co; a and b, J. A. McLennan.

JOLIET, ILL.—Grain elevator corrugated iron; cost $225,000; o, Joliet Elevator Co.; a and b, J. A. McLennan.

RAVENSWOOD, ILL.—Br and st church; cost $7,000; o. All Saints' Epis. church; a, J. M. Willet.

LE MARS, IOWA.—Opera House, cost $30,000; Warren and Sammis, a, Correy; b, Loft.

SIOUX FALLS, IOWA.—Dwelling; cost $3,500; E. P. Beebe, a, G. G. Baldwin.

A market company in Dublin has been tearing down numbers of diseased and rickety tenement houses and putting up handsome new market buildings.

A trunk belonging to a passenger who had come East from Cincinnati sick with small-pox, was taken from the Albany depot of the Albany & Susquehanna Railroad, the other day, by the Health Officer, Dr. O'Leary. The Board of Health has ordered an investigation into the circumstances connected with the transit of a passenger sick with that disease.

NOT AN UNMIXED EVIL.

In North Lansing, Mich., "much dissatisfaction was developed" at many of the best wells within a block of the newly constructed sewers going dry, in consequence of the underdrainage of the soil by the sewers. As the water had previously stood within two feet of the ground, it seems as if the injury to the water supply would be more than compensated by the removal of the surplus water in the soil, not to speak of the cellars, which the sewers must effect.

The systematic inspection of waste in houses has produced excellent results in Cincinnati during the past year. The amount of water pumped has been actually less than in 1879, 1880, or 1881, and the saving in coal over last year has been 4,000 tons. The fact seems to be that the Cincinnati officials are not wild to build a new engine, or a new reservoir, or an aqueduct, or something, and besides, they have stop cocks on the service pipes at the edge of the sidewalk, so that in the night watches they can listen and discover whether water is being wasted, instead of being obliged to creep into sewers, as the New York waste inspectors do, in the spasmodic examinations they make.

SUPPOSED SUBTERRANEAN DRAINAGE OF THE INTERIOR OF AUSTRALIA.—In a paper in the *Journal* of the Royal Society of N. S. Wales, Vol. XV., 1882, entitled, "Notes of a Journey on the Darling," by Mr. W. E. Abbott, the author refers to the observations of Mr. Russell, which seem to prove that the amount of water received by precipitation over the water-shed of the Darling much exceeds that which is carried off by the Darling and by evaporation, and he inclines to the opinion expressed by Mr. Russell, that there is an underground drainage system wholly distinct and different in direction from the surface drainage. The underground water would probably take a course to the southwest, and he suggests that this may have been the course of a more ancient river system. Some evidence with regard to such subterranean waters is presented from wells which have been sunk in the vicinity of the Darling, and whose flow seems to be independent of variations in that river.—*Mining and Scientific Press.*

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING DECEMBER 23, 1882.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland ... Maine	34,519	9	13.5	4	44.4				3		1													
Boston ... Mass	407,581	170	21.4	50	29.4	7		30	2	2	18		7			18		10		2	1			
Cambridge ... Mass	57,432	23	20.8	5	21.7	1		10								1		1						
*Worcester ... Mass																								
*New Haven ... Conn																								
Providence ... R. I.	114,723	58	26.3	10	17.2	2	1	12		1	3		3			6		2	1		3			
Total	614,255	260	22.2	69	26.5	10	1	52	5	3	22		10			25		13	1	2	4			
EASTERN CITIES.																								
Albany ... New York	98,430	40	20.8	21	52.5			3	2		2		1	1	1	2	2	2		3			1	
New York ... New York	1,299,249	617	24.7	219	35.4	29		92	15	11	21	1	6	7	15	84		30		9	5		8	
Brooklyn ... New York	633,763	251	20.3	90	35.8	9		31	7	1	8	1	4	5	11	43	3	15	1		3			
*Hudson Co ... New Jersey																								
Newark ... New Jersey	147,744	61	21.4	28	45.9		1	11	1	2	1				3	6		4						
*Camden ... New Jersey																								
Philadelphia ... Pa.	907,043	413	23.7	148	35.8	8		56	12		29		20		9	41	4	11				2	3	
*Reading ... Pa.																								
Wilmington ... Delaware	46,889	17	18.7					6					1			2								
Total	3,133,118	1,399	23.2	506	36.1	46	1	199	37	14	61	2	32	13	39	178	9	62		12	8	2	12	
LAKE CITIES.																								
*Buffalo ... New York																								
Rochester ... New York	92,116	30	16.9	11	36.6	2		2			3	1	2		1	1								
Syracuse ... New York	54,696	25	23.4	9	36.0	2		5		1				1		4	1							
*Cleveland ... Ohio																								
Detroit ... Michigan	131,118	46	18.2	27	58.6			3	4		7		1		5	5								
Chicago ... Illinois	597,834	200	17.3	82	41.0	7	4	31	7	1	11	3	10	1	4	17		8			6	4	1	
Milwaukee ... Wisconsin	135,233	61	23.4	26	42.6	2		6	4		5		2	1	2	9		3						
Total	1,010,997	362	18.6	155	42.8	13	4	47	15	2	26	4	15	3	12	36	1	11			6	4	1	
RIVER CITIES.																								
Allegheny ... Pa.	89,038	22	12.5	6	27.2	1	1	4		2			5			1								
Pittsburgh ... Pa	191,523	63	17.0	22	34.9	7		7		2	2		8		1	8	1	2		1		1	1	
Cincinnati ... Ohio	267,767	121	23.4	41	33.8	3		13	3	4	3		3	1	16	10	1	8					2	
Dayton ... Ohio	41,648	17	21.2	8	47.0			3								1		1				1		
Louisville ... Ky.	131,529	52	20.5	16	30.7			8	1	1			2			9					2	6	1	
Indianapolis ... Indiana	86,529	19	10.9	6	31.5					1			3			2		1						
Terre Haute ... Indiana	30,464	4	6.7	1	25.0			1	1		1													
Minneapolis ... Minn	98,026	30	15.9	6	20.0		1	1	3		1	1	3			4		1		1		3		
St. Paul ... Minn	53,683	19	18.2	7	36.7		1	1	1		5		1			1	1	1						
St. Louis ... Mo.	362,816	168	24.9	66	39.2	8	3	21	6	4	23	1	2	1	9	21		4			1			
Total	1,353,023	515	19.7	179	34.7	19	6	59	15	14	35	2	27	2	26	57	3	18		2	3	11	4	
PACIFIC CITIES.																								
*San Francisco ... Cal. ... (Dec. 9)																								
Total																								
SOUTHERN CITIES.																								
District of Columbia ... Wh.	136,471	33	12.5	10	30.3	2		5		1	1					4	1	2			1			
" " ... Col.	71,103	39	27.1	14	35.9	1		15								5	2	1						
Richmond, ... Va. ... Wh.	38,526	11	14.5	2	18.1			4		1			1		1	1								
" ... Col.	29,804	19	33.3	4	21.0			4	1				1			2								
Charleston ... S. C. ... Wh.	22,699	18	41.1	3	16.6			2					2					1			2			
" ... Col.	27,595	16	29.6	5	31.2			4					2											
Atlanta ... Ga. ... Wh.	25,583	9	18.2	5	55.5	1				5														
" ... Col.	19,221	5	13.5	1	20.0	1		1								1	1							
*Savannah ... Ga. ... Wh.																								
" ... Col.																								
Nashville ... Tenn. ... Wh.	31,993	6	9.7	2	33.3									1	1			1						
" ... Col.	19,400	11	29.4	4	36.8			2		1					1	1								
Memphis ... Tenn ... Wh.	18,677	15	41.8	1	6.6	1		4			1			2		1								
" ... Col.	14,896	15	52.1	2	12.6	1		2	1	1						3								
*Mobile ... Ala. ... Wh.																								
" ... Col.																								
*New Orleans ... La. ... Wh.																								
" " ... Col.																								
Total White	273,949	92	17.3	23	25.0	4		15		7	2		3	3	2	6	1	4			3			
Total Colored	181,615	105	30.2	30	28.5	3		28	2	2			3		1	12	3	1						
Total in 31 U. S. Cities	6,566,957	2,733	21.6	962	35.2	95	12	400	74	42	146	8	90	21	80	314	17	109	2	16	24	17	17	
Dec. 9—Total in 28 English Cities	8,469,571	3,794	23.4			119				39	29		81		110					119		13	81	
" " " 8 Scotch "	1,206,057	657	28.0			16				12	24		19		18					16			39	
" " " 16 Irish "	843,553	467	28.8			8		47		8	1		9		15					13			6	
Nov. 11, " 167 German "	8,464,459	3,677	22.6	1,724		119				23	164	165			60		114					36	27	2	51
" 18, " 166 " "	8,489,558	3,722	22.8	1,692		102				28	142	215			54		102					73	22		44
" 25, " 170 " "	8,516,821	3,830	23.4	1,755		82				34	135	196			57		111					67	20		54

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to December 1, 1882.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending Dec. 23 of a municipal population of 6,566,957 there died 2,733, corresponding to an annual mortality of 21.6 per 1,000. This is less than the rate for the preceding week, which was 22.3 and less than that of any of the groups of European cities reported. Diphtheria continues unusually prevalent in Boston, Philadelphia, St. Louis and Detroit. A large part of the deaths reported as due to croup, should no doubt be charged to diphtheria. Scarlet fever caused a relatively large number of deaths in Cincinnati. The mortality is lowest among the southern whites, and in the Lake Cities, but among these last Buffalo and Cleveland are not reported. Pneumonia caused 11.4 per cent. of all the deaths as against 9.7 per cent. for the preceding week.

LOUISVILLE, KY.—Dr. E. R. Montgomery reports that eight cases of small-pox caused five deaths in hospital and one death outside the city limits.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 14 new cases of scarlet fever and six of diphtheria with 35 of the former disease and 11 of the latter carried forward from last week.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports eight admissions, 12 discharges and one death, leaving 1,334 insane under treatment.

INDIANAPOLIS, IND.—Dr. E. S. Elder reports scarlet fever as decreasing.

BOSTON, MASS.—C. E. Davis, Jr., reports 51 cases of diphtheria, 27 of scarlet fever and 19 of typhoid fever.

The Providence *Journal* of Dec. 18, in commenting on the prevalence of typhoid fever in that city, refers to Boston as having had 8,527 cases of the disease *during the last four months*. The cases reported to the Boston Board of Health are as follows: August, 60; September, 216; October, 173; November, 91. Total during the four months, 530 cases.

DAYTON, OHIO.—Dr. E. B. Davis reports the occurrence of three cases of small-pox.

ROCHESTER, N. Y.—Dr. Wm. F. Sheehan reports that the Health Board has had the manholes of the sewers freed from ice and snow.

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and that the deaths from diphtheria have diminished 50 per cent. as compared with the previous week.

PITTSBURGH, PA.—Dr. Snively reports two new cases of small-pox.

ROCK ISLAND, ILL.—Dr. G. G. Craig, Commissioner of Health, reports five deaths during the two weeks ending December 16. There are no zymotic diseases.

BALTIMORE, MD.—There were 226 deaths in Baltimore during the week. Of these 113 were males and 113 females; 86 were under five years. The annual rate calculated on the police census was 28.73. Small-pox gives the largest death record, it having caused no less than 57 deaths. Diphtheria caused 19 deaths, croup six, consumption 24, and pneumonia 11.

PROVIDENCE, R. I.—Dr. E. M. Snow notes the increased mortality during the present week as one of those accidental variations which occur in the weekly mortality of a city of the size of Providence, or any smaller city where the variation is so great in proportion to the whole number of deaths that it seems much more important than it really is. On account of this variation weekly reports from any small city are misleading and deceptive if used as a standard for the true rate of mortality or for comparison with the mortality of other places.

MICHIGAN.—Dr. H. B. Baker reports the following diseases in their order of prevalence in the State during the week: bronchitis, neuralgia, rheumatism, tonsilitis, intermittent fever, consumption, influenza and pneumonia. The last case of small-pox was discharged from hospital at Grand Rapids, December 14.

PERNAMBUCO, BRAZIL.—Consul Atherton reports the small-pox as declining; only four deaths were caused by it during the week ending November 19.

RIO DE JANEIRO.—Deputy Consul General Murray reports the health of the city as fair but for the presence of small-pox. The deaths for the week ending November 25 numbered 226, of which 41 were caused by small-pox and 37 by consumption.

AUX CAYES, HAITI.—Vice-Consul Th. Dutton reports 18 deaths from small-pox during the five weeks ending December 2.

PORT AU PRINCE, HAITI.—Consul J. M. Langston under date of December 5, reports that rumors of small-pox are prevalent, but the disease has not been officially acknowledged by the sanitary authorities.

ENGLAND.—The return of the *Registrar General* for the week ending Dec. 9, shows an average death rate in the 28 large towns of 23.4 per 1,000. The smallest rate was in Derby, 16.2; the largest in Sunderland, 35.5; in London the rate was 22.4. An abstract of the return is given in our weekly table.

SCOTLAND.—Consul J. A. Leonard, Edinburgh, transmits the return of the *Registrar General* for the week ending Dec. 9. The average death rate in the eight principal towns was high, 28.0 per 1,000. This rate is 6.4 above that for the corresponding week of last year and 3.2 above that for the previous week of the present year. The lowest mortality was recorded in Edinburgh, 21.9, and the highest in Perth, 37.8 per 1,000. From acute diseases of the chest 185 deaths were reported, or 46 more than in the previous week. For an abstract of the return see table given above.

IRELAND.—Consul A. B. Wood, of Belfast, sends the *Registrar General's* return for the week ending Dec. 9. An abstract is given in our statistical table.

PARIS, FRANCE.—During the week ending Nov. 29, there were 1,064 deaths, males 573, females 491; equaling an annual mortality rate of 24.71. Typhoid fever caused 73 deaths, small-pox 11, measles eight, scarlet fever two, whooping cough two, diphtheria 32, consumption 212, pneumonia and bronchitis 107, and violence 31 deaths. During the week ending Dec. 6 there were 1,135 deaths: males 593, females 542. Annual rate 26.34. Deaths from typhoid fever and consumption decreased in number; those from acute lung affections increased.

BRUSSELS, BELGIUM.—During the week ending Dec. 2 there were 181 deaths, equal to an annual rate of 23.0 per 1,000. Diarrhœal diseases caused 17 deaths, acute lung affections 34, consumption 24. Zymotic diseases did not contribute much to the mortality, as there were but four deaths from croup, two each from typhoid and scarlet fevers and one each from small-pox and measles.

RHEIMS, FRANCE.—Consul Jno. L. Frisbie reports 34 deaths during the week ending Dec. 4. Croup caused two deaths, measles one, and small-pox one.

ST. PETERSBURGH, RUSSIA.—Consul General Edgar Stanton reports 589 deaths during the week ending Nov. 25, 282 of which were under five years. Small-pox caused 33 deaths, and typhoid fever 24; diphtheria and scarlet fever are said to be prevailing. During the ten months ending Oct. 31, there were recorded 2,217 cases of diphtheria, of which 1,066 proved fatal. A mortality of 47.1 per cent.

SPAIN.—The Spanish Monthly *Bulletin* for September shows the occurrence of 34,507 deaths in a population of 16,847,580, this being equal to a mortality rate of 2.048 per 1,000; the corresponding birth rate having been 2,139.

Of the decedents 19,160 were under five years and 5,352 over 60 years. Small-pox caused 1,416 deaths, measles 1,191, scarlet fever 165, diphtheria and croup 817, typhoid fever 450, typhus fever 409, dysentery 1,563, puerperal fever 505, malarial fevers 480, consumption 1,509, acute diseases of the lungs 2,488, and accidents and violence 390.

VIENNA, AUSTRIA.—Consul General Weaver reports 342 deaths during the week ending Dec. 2. Rate 24.0. Birth rate 37.0. Small-pox caused six deaths, measles one, scarlet fever three, diphtheria three, whooping-cough six, typhoid fever four and consumption 61 deaths.

MONTHLY REPORTS FOR NOVEMBER.

BOSTON, MASS.—Samuel H. Durgin, Chairman Board of Health. Deaths 697; rate 20.3; males 333, females 364; under 5 years 193; accidents, etc., 35; cerebro-spinal meningitis 1, consumption 149, croup 15, diarrhœal diseases 25, diphtheria 48, erysipelas 2, typhoid 19, scarlet fever 8, pneumonia 60, bronchitis 24, puerperal fever 5, whooping-cough 4; no deaths from measles or small-pox. Cases reported during the month, diphtheria 188, scarlet fever 102, typhoid fever 92.

LOWELL, MASS.—Office Board of Health, City Hall. Deaths 80; of 29 distinct diseases reported as causing death, 18 caused only one death each. Consumption caused 18 deaths and pneumonia 8. There is only one death from contagious diseases, whooping cough.

NEW HAVEN, CONN.—C. A. Lindsley, M.D., Health Officer. Deaths 85; males 49, females 36; under 5 years 27, over 60 years 16; annual rate 14.6. Consumption 18, diphtheria and croup 9, typhoid fever 4, malarial fevers 4, scarlet fever 1, pneumonia 6, bronchitis 3, and puerperal diseases 1. No deaths from small-pox or measles.

PROVIDENCE, R. I.—Edwin M. Snow, Supt. of Health. Deaths 247; males 118, females 129; white 235, colored 12; under 5 years 46, over 60 years 45. Accidents, etc., 9, consumption 24, croup 8, diarrhœal diseases 6, diphtheria 7, typhoid fever 70, malarial fevers 2, scarlet fever 1, pneumonia 19, bronchitis 8, puerperal diseases 2 and whooping cough 2. The progress of the typhoid fever epidemic has been already noted in our weekly notes.

PATERSON, N. J.—George Boyd, Registrar. Deaths 100; population 55,000; males 53, females 47; under 5 years 35, over 60 years 16; accidents 3, consumption 16, croup 4, diarrhœal diseases 1, diphtheria 3, scarlet fever 1, pneumonia and bronchitis 7, small-pox 6.

HUDSON CO., N. J.—C. J. Rooney, Jr. Deaths 330; births 438; still-births 34; mortality rate 19.1; deaths under 5 years 152; accidents 13, cerebro-spinal fever 1, consumption 40, croup 13, diarrhœa 3, diphtheria 19, typhoid fever 5, malarial fever 1, scarlet fever 9, puerperal fever 2, pneumonia 42, congestion of lungs 5, bronchitis 14, measles 11, whooping cough 2; no deaths from small-pox are recorded.

SCRANTON, PA.—T. P. O'Malley, Secretary. Deaths 40; males 23, females 17; under 5 years 9, over 60 years 9. The report does not show the population or annual rate. Violence 6, consumption 2, croup 1, diarrhœa 2, diphtheria 2, typhoid fever 1, pneumonia 2, bronchitis 1, and whooping cough 1; no deaths from measles, small-pox or scarlet fever. Births 75, males 43, females 32.

TOLEDO, OHIO.—C. L. Van Pelt, Health Officer. Deaths 53; males 28, females 24, unknown 1; under 5 years 19, over 60 years 7; violent deaths 5, consumption 7, croup 1, diarrhœa 1, diphtheria 9, typhoid fever 2, pneumonia 1, congestion of lungs 2, bronchitis 2, and puerperal diseases 1. Annual mortality rate for the month 10.6 per 1,000.

CHICAGO, ILL.—Oscar C. DeWolf, Commissioner of Health. Deaths, 811; stillbirths, 69; mortality rate, 17.36; male decedents, 442; female, 369; under five years, 347; over 60 years, 102; five of whom were over 90 and one over 100 years. Accidents, etc., 44, consumption 65, croup 22, diarrhœal diseases 11, diphtheria 53, erysipelas four, typhoid fever 38, malarial fevers nine, scarlet fever 37, pneumonia 61, congestion of lungs eight, bronchitis 39, pleurisy 1, measles three, puerperal diseases 11, small-pox 14, and whooping cough six.

ST. PAUL, MINN.—C. A. Wheaton, Health Officer. Deaths, 109; males 68, females 29, but these do not sum the total of 109. Under five years, 42; over 60 years, 12. Accidents eight, cerebro-spinal meningitis two, consumption nine, croup five, diarrhœal diseases one, diphtheria 15. erysipelas one, typhoid fever 18, pneumonia three, congestion of lungs one, bronchitis two, whooping cough one. No deaths from measles or small-pox.

MINNEAPOLIS, MINN.—J. C. Cockburn, M. D., Health Officer. Deaths, 120; rate 18.0; males 61, females 59. Under five years, 45; over 60 years, eight. Accidents two, cerebro-spinal fever two, consumption eight, croup three, diarrhœa one, diphtheria 25, pneumonia seven, congestion of lungs four, typhoid fever 24, small-pox one, puerperal fever two. No deaths are recorded from measles, scarlet fever, or whooping cough.

DETROIT, MICH.—O. W. Wight, M.D., Health Officer. Deaths, 241; rate, 23.45; males 121, females 120 Under five years, 93; over 60 years, 25. Accidents three, croup 15, consumption 19, diarrhœal diseases two, diphtheria 49, erysipelas one, typhoid fever three, malarial fevers eight, scarlet fever 24, pneumonia eight, congestion of lungs one, bronchitis 10, and puerperal diseases four. No deaths recorded from small-pox, measles, or whooping cough.

BURLINGTON, IOWA.—S. H. Stutsman, City Physician. Deaths 24; population, 27,000; males 10, females 14. Under five years, eight, over 60 years, two. Accidents two, consumption three, typhoid fever three, croup one, pneumonia two. No deaths from scarlet fever, measles, small-pox, diphtheria, or whooping cough.

MILWAUKEE, WIS.—R. Martin, M. D., Commissioner of Health. Deaths, 186; rate, 17.9; males 90, females 96. Under five years, 89; over 60 years, 23. Accidents eight, cerebro-spinal fever four, consumption 14, croup seven, diarrhœa two, diphtheria 15, typhoid fever three, typhus fever one, scarlet fever four, pneumonia 11, congestion of lungs two, bronchitis eight, whooping cough one, and puerperal diseases four. No deaths from small-pox or measles.

KEOKUK, IOWA.—Geo. F. Jenkins, President Board of Health. Deaths, 18; population, 15,000; male decedents, nine; females, nine; under five years, seven; over 60 years, four; consumption, three; typhoid fever, two; croup, one; pneumonia, one No diphtheria, measles, small-pox, scarlet fever, or whooping cough.

DISTRICT OF COLUMBIA.—Smith Townshend, M. D. Health Officer. Births, 238; white males, 67; females, 79; colored males, 45; females 46; unknown sex and color, one. One case of triplets and four cases twins reported. Deaths, 316; rate 20.05; white males, 82; females, 80; colored males, 72; females, 82. Annual rate for white people, 15.58; for colored, 28.69. Accidents, etc., 6, consumption 59, croup one, diarrhœal diseases 13, diphtheria 17, erysipelas one, typhoid fever six, malarial fevers nine, scarlet fever eight, pneumonia 28, congestion of lungs two, bronchitis nine, pleurisy one, puerperal diseases, two and whooping cough one. No deaths from measles or small-pox.

RICHMOND, VA.—J. G. Cabell, President Board of Health. Deaths, 122; white males 32, females 23, colored males 36, females 31; under five years 46, over 60 years 20. Rate 21.52. Casualties four, cerebro-spinal meningitis one, consumption 16, croup one, diarrhœal diseases three, diphtheria two, typhoid fever two, malarial fever one, pneumonia seven, and puerperal fever two.

NORFOLK, VA.—Jas. D. Galb, M. D., Health Officer. Deaths 44; white males seven, females seven; colored males 13, females 17; under five years, white seven, colored 15; over 60 years, white one, colored five; accidents two, cerebro-spinal fever one, consumption four, croup three, diarrhœa three, diphtheria two, typhoid fever one, malarial fevers two, pneumonia four. No scarlet fever, measles or small-pox. The report is deficient in giving neither the rate nor the population.

NASHVILLE, TENN.—Richard Chatham, M.D., Health Officer. Deaths, 91; white males 22, females 29; colored males 16, females 24; annual rate 23.66, for white people 20.91, for colored 30.00; under five years 31; over 60 years 18; accidents six, consumption 14, croup two, diarrhœa two, diphtheria one, erysipelas one, typhoid fever one, malarial fever four, pneumonia five, and pleurisy one. No deaths from measles, scarlet fever, small-pox or whooping cough.

MOBILE, ALA.—E. H. Fournier, Health Officer. Death 87; white males, 18; females, 22; colored males, 27; females, 20; under five years 25, over 60 years 10. Average death rate per 1,000 for the month 2.77. Consumption, eight; croup, three; diphtheria, two; dysentery, two; typhoid fever, four; malarial fevers, seven; pneumonia, two; congestion of the lungs, two; bronchitis, one. No deaths from measles, scarlet fever, small-pox or whooping cough.

CALIFORNIA.—F. W. Hatch, Sec. State Board of Health. Twenty-two localities reporting give a total of 637 deaths. Of the towns heard from four are near the coast, three in the coast valleys, ten in the interior valley and five in the mountains. Taken together they embrace nearly half the population of the State. Annual rate 19.14. Dr. W. C. Jones reports typhoid and typho-malarial fevers as prevailing in Nevada County, and Dr. C. W. Evans sends a similar report with regard to Moderto in the San Joaquin Valley. Diphtheria and scarlet fever are increasing. Seventy-eight deaths were due to acute lung diseases, and they are reported as more or less prevalent from all the localities heard from.

SAN FRANCISCO, CAL.—J. L. Meares, M.D., Health Officer. Deaths, 400; males, 265, females, 135; under five years, 96, over 60 years 46; population 234,520. Accidents, etc., 20; consumption, 70; croup, four; diarrhœa and dysentery, seven; diphtheria, 14; erysipelas, one; typhoid fever, 17; malarial fever, three; scarlet fever, two; pneumonia, 26; congestion of lungs, four; bronchitis, 11 and puerperal diseases, three. No deaths from measles, whooping cough or small-pox.

Tables showing number of new patients at six New York City dispensaries for the week ending December 16, 1882, with some of the principal acute diseases.

Name of Dispensary and Reporter.	Character of Disease.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Total.
New York Dispensary, Reported by Dr. Wm. A. Valentine.	Acute Diseases.	28	18	19	19	13	22	119
	Chronic Dis'es & Surg. Cases.	59	41	44	44	36	43	267
Demilt Dispensary, Reported by Dr. E. J. Dalken.	Acute Diseases.	14	37	11	23	16	19	120
	Chronic Dis'es & Surg. Cases.	44	46	28	42	43	30	233
Bureau Med. Relief, Dpt Char. and Corrections. Reported by Henry Savage.	Acute Diseases.	60	62	61	33	60	50	326
	Chronic Dis'es & Surg. Cases.	22	22	20	22	21	25	132
Northern Dispensary, Reported by W. B. Linn	Acute Diseases.	36	17	18	28	13	21	133
	Chronic Dis'es & Surg. Cases.	16	5	4	8	7	8	48
Eastern Dispensary, Reported by Dr. S. S. Bogert.	Acute Diseases.	53	39	29	31	9	30	91
	Chronic Dis'es & Surg. Cases.	32	28	20	23	10	29	142
North Eastern Dispensary, Reported by Dr. W. Schoonover.	Acute Diseases.	48	29	35	46	41	32	231
	Chronic Dis'es & Surg. Cases.	34	26	27	26	34	21	168
Total.....	Acute Diseases.	239	202	173	180	152	174	1120
	Chronic Dis'es & Surg. Cases.	207	168	143	165	151	156	990

Name of Dispensary.	Total New Patients.	Under 5 Years.	Males.	Females.	Whooping Cough.	Malarial Fever.	Diarrhœal Diseases.	Acute Lung Diseases.	Brain Diseases.
New York Dispensary	386	*16	210	160	2	13	1	49	
Demilt Dispensary.....	353	55	164	189	6	24	6	52	1
Bureau of Med. Relief, Dept. Charities & Corr'c'n	458	73	240	218	8	65	11	150	14
Northern Dispensary.....	181	16	....	...	....	....	2	36	....
Eastern Dispensary	332	70	141	191	...	12	7	127	...
North Eastern Dispensary	399	72	167	232	...	23	7	83	4
Total.....	2109	302	922	990	16	137	34	497	19

*Sex not given.

During the week ending December 16, 1,120 cases of acute disease received attention, an increase over the preceding week, the number for which was 898. The prevailing diseases are those of the lungs; the proportion of cases reported as malarial fevers is high for the time of year. Eleven cases of measles, six of diphtheria and one of typhoid are reported.

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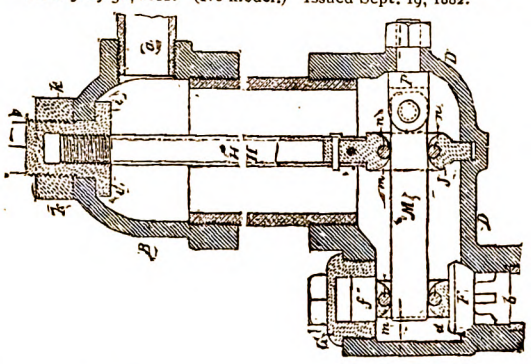
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

264,788. STEAM TRAP. GEORGE S. STRONG, Philadelphia, Pa., Filed July 31, 1882. (No model.) Issued Sept. 19, 1882.

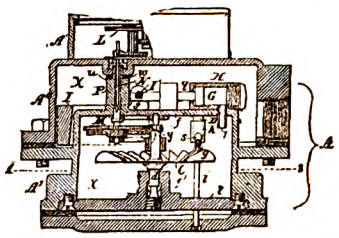


Claim.—1. The combination of the lever M with a valve stem or block, J, having a slot, *m*, with transverse bearing pins, *n*, as set forth.

2. The combination of the casing of the trap, the expansion tube H and its slotted block J, the balanced valve F, having a slotted stem, *d*, and the lever M, adapted to the slots of the valve stem and block J, as set forth.

3. The combination of the casing of the trap, the expansion tube H threaded at the upper end, the nut *k*, and the flanged sleeve *h*, having an internal thread adapted to that on the tube H, and an external thread for the reception of the nut *k*, as set forth.

264,702. ROTARY WATER METER. JONATHAN JOHNSON, Lowell, Mass. Filed March 7, 1882. (No model.) Issued Sept. 19, 1882.



Claim.—1. A fluid meter provided with a bladed wheel gearing with the registering mechanism, with two or more independent passages of different sizes for intersecting streams of water upon said wheel, and valves controlling the flow of water in the larger passage only, and an automatic device whereby the said larger passage is opened in proportion to the amount of water required, substantially as set forth.

The combination, with a fluid meter provided with registering mechanism and a driving wheel actuated by the passage of fluid through the meter, of a supplemental tube, affording a passage for a small stream, whereby the wheel is revolved when the main passage is closed, for the purpose set forth.

3. The combination in a meter, with one or more valves controlling the main fluid passage, of a regulating device communicating with the chambers connected by such passage, and provided with a piston and with openings whereby the pressure of fluid in the two chambers is brought upon opposite sides of the piston, for the purpose set forth.

4. The combination in a meter, of registering devices operated by a stream flowing through the meter, a valve controlling the said stream and an independent regulating device connected to said valve and constructed to be operated by the varying pressure in the meter, as set forth.

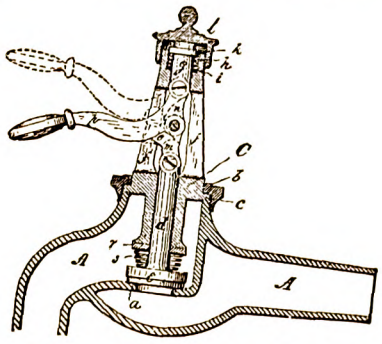
5. The combination of the valves E, controlling the main fluid passages and the cylinder, piston, and ports by which communications are established between the opposite ends of the cylinder and the chambers connected by said passages, and a weighted lever connected to the valves and piston, substantially as set forth.

6. The combination in a fluid meter, of the valve regulating the flow of fluid between the chambers connected by the main passages, an operating wheel, C, and an independent tube, J, connecting the chambers, substantially as set forth.

7. The combination with the tubes through which the operating streams are injected upon the register operating wheel, of the adjustable nozzles and devices extending to the outside of the case and constructed to move said nozzles, substantially as described.

8. The case A^2, provided with a hollow stud, P, in combination with the perforated case A^4, packing *w*, arranged between a shoulder on the stud and the top of the case A^4, and screw cap and packing upon the upper end of the stud, all in combination with the spindle N, driving wheel and train, and registering devices, as specified.

264,715. COMPRESSION COCK. ROBERT H. LECKY, Allegheny, Pa. Filed May 8, 1882. (No model.) Issued Sept. 19, 1882.



Claim.—1. In a compression cock, an axially reciprocating valve and an adjustably fixed fulcrum, in combination with two toggle levers interposed between and pivoted to said fulcrum and valve or valve stem, the pivotal points of connection of said toggles to the said valve and fulcrum being on the axis of movement of said valve, and suitable means of operating either of said toggle levers, substantially as described.

2. In a compression cock, the combination of a reciprocating valve, *c*, having stem *d*, stem-guide C, independent pin *g*, and the toggles *m n*, interposed and forming the sole connection between said stem *d* and pin *g*, substantially as described.

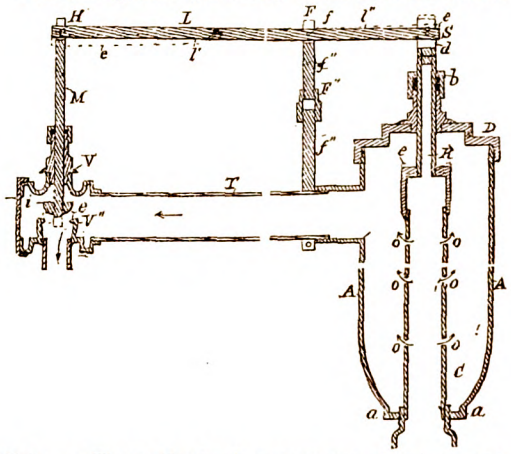
3. In a compression cock, the combination with the reciprocating valve *c*, having stem *d*, of the toggles *m n*, pin *g*, having collar K, stem-guide C, spring *i*, and adjustable cap nut *l*, substantially as described.

4. In a compression cock the combination with the pin *g* and valve stem *d*, of the abutting toggles *m n*, toggle *m* having the shoulder or abutment *o*, and toggle *n* having the handle *p*.

5. In a compression cock the combination of the post C, having radial slots *f*, with valve stem *d*, toggles *m n*, a fixed fulcrum for said toggles, and a projecting handle, *p*, substantially as described.

6. In a compression cock, the combination of bib A, post C, having flange *c*, cap *b*, valve stem *d*, valve *e*, washer *r*, and spring *s*, substantially as described, with suitable means for reciprocating said valve stem.

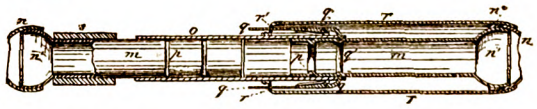
264,895. STEAM TRAP. JAMES PARK, Troy, N. Y., assignor to John L. Russell and Charles Corlies, both of same place. Filed Mar. 13, 1882. (No model.) Issued September 26, 1882.



Claim.—1. The combination, in a steam-trap, of an inner perforated tube firmly secured to the trap-base in direct communication with the trap-inlet at its lower end, and its upper closed end projected through a stuffing-box in the trap-cap, and a lever having a pivoted fulcrum with its short arm pivoted to the projected closed end of the perforated tube, and its long arm pivoted to the stem of a discharge-valve arranged upon the trap egress-opening, whereby the valve-opening is closed by the expansion of the inner tube.

2. In combination a steam-trap consisting of the exterior cylinder, A, offset-pipe T, inner perforated tube, C, secured to the base of the trap at one end and in direct communication with the trap inlet, the stuffing-box *b*, cap D, lever L, fulcrum F, valve-rod M, and valve V, constructed and arranged to close the valve by the expansion of the tube, as herein shown and described.

264,914. PIPE COUPLING. WILLIAM H. WARD, Pittsburgh, Pa. Filed Mar. 18, 1882. (No model.) Issued September 26, 1882.



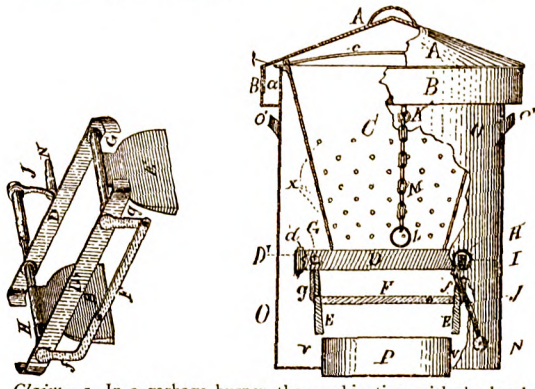
Claim.—1. The combination, with the separate fixed supply pipes *a a* and the ball-and-socket-joint pipe-sections *m m*, of the sleeve *o*, carried by one of said pipe-sections and made extensible thereon to envelop and support the other pipe section after the cars have been coupled, substantially as described.

2. The combination, with the supply-pipes *a*, of the joint pipe sections *m m*, the sliding sleeve *o*, and the fixed jacket *r*, substantially as described, for the purpose specified.

3. The combination of the separate fixed supply-pipes *a a*, the ball and socket-joint pipe-sections *m m*, and the sleeve *o*, extensible upon one of said pipe-sections, with the catches *q q*, carried by said extensible sleeve, substantially as described, for the purpose specified.

4. In combination, the supply-pipes *a*, the joint pipe-sections *m m*, the sliding sleeve *o*, the catches *q q*, and the fixed jacket *r*, the said sleeve being carried by one of said pipe sections, and the said jacket being fixed to the supply-pipe and enveloping the said sleeve-carrying pipe-section, substantially as described, for the purpose specified.

264,920. DOMESTIC GARBAGE-BURNER. AGRIPPA N. BELL, Garden City, N. Y. Filed Feb. 12, 1881. (No model.) Issued September 26, 1882.



Claim.—1. In a garbage burner, the combination, with the kettle O, having an aperture in the base for the admission of the flame and heat, of the straining-pail C and dumping-bottom, substantially as set forth.

2. The combination of the kettle O, cover A, base-aperture, and inserted-ring P, extending both inside and outside of the bottom, forming a stove ring on the outside and partitioning off the liquid chamber *v* on the inside, with the perforated conical pail C and removable or dumping bottom, substantially as set forth.

3. The kettle O, provided with the chamber *v* and drip-chamber B, in combination with the cover A, having the lip *a* inserted in the drip-chamber B, and with the strainer C, provided with a dumbing-bottom, substantially as set forth.

4. In a garbage-burner of the kind described, the combination, with the kettle O, having suitable supporting means for the dumping-frame D D^1, dumping wings E E, shafts H G and connecting-levers F *f g*, as set forth.

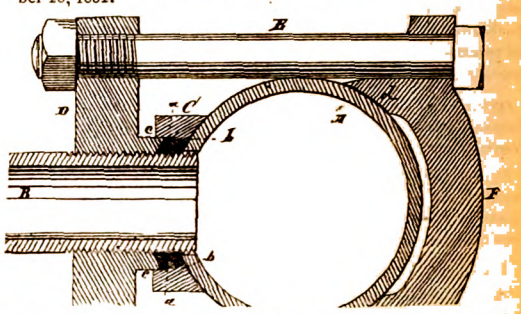
5. The kettle O, provided with the ring P, in combination with the pail C and dumping-bottom, as set forth.

6. The garbage-burner described, consisting of the kettle O, provided with pan B and ring P, in combination with pail C, *x* and dumping-bottom E D D^1 F *f g* G H, as set forth.

264,918. SELF-LUMINOUS PAINT. WILLIAM H. BALMAIN, Eversley, Ventor, County of Hants, Isle of Wight, England; Harriet Fox, executrix of said William H. Halmain, deceased. Filed Nov. 20, 1878. Patented in England Nov. 7, 1877, No. 4,152; in Victoria Dec. 31, 1879, No. 2,766; in Italy Dec. 31, 1880, XXV, 131; in Belgium Jan. 3, 1881, No. 53,483; in Tasmania Mar. 21, 1881, No. 192; in New Zealand Apr. 28, 1881, No. 523; in Spain, May 21, 1881, No. 1,455; in Sweden June 18, 1881; in New South Wales June 26, 1881, No. 947; in Queensland July 12, 1881, No. 354; in Portugal July 21, 1881, No. 688, and in Austria Dec. 7, 1881, No. 33,137. Issued September 26, 1882.

Claim.—A luminous paint the body of which is a phosphorescent substance or composed in part of such substance, the vehicle of which is such as is ordinarily used in paints—viz., one which will become dry by oxidation or evaporation—substantially as herein described.

264,936. MANIFOLD PIPE-JOINT. WILLIAM W. DOOLITTLE, Chicago, Ill. Filed June 12, 1882. (No model.) Issued September 26, 1882.



Claim.—In combination with a main pipe, A, and a branch pipe, B, a ring, C, packing-ring *a*, gland D, and a clamping device, all substantially as and for the purpose specified.

264,649. DYNAMO OR MAGNETO ELECTRIC MACHINE. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed March 20, 1880. (No model.) Patented in England April 5, 1880, No. 1,385; in Canada Oct. 9, 1880, No. 11,857; in Italy Oct. 12, 1880; in Belgium Oct. 15, 1880, No. 52,698; in Victoria Nov. 17, 1880, No. 2,026; in France Nov. 27, 1880, No. 138,941; in Austria Dec. 24, 1880; in New South Wales Jan. 19, 1881. in Queensland Feb. 7, 1881; in Spain Feb. 21, 1881; in New Zealand March 7, 1881, No. 511; in Portugal March 31, 1881, No. 660, and in India April 12, 1881, No. 278. Issued Sept. 19, 1882.

264,650. MANUFACTURE OF INCANDESCING ELECTRIC LAMPS. THOMAS A. EDISON, Menlo Park, N. J. Filed Dec. 9, 1881. Renewed Aug. 14, 1282. (No model.) Issued Sept. 19, 1882.

264,651. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No model.) Issued Sept. 19, 1882.

264,652. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No model.) Issued Sept. 19, 1882.

264,653. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No. model.) Issued Sept. 19, 1882.

264,654. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No. model.) Issued Sept. 19, 1882.

264,655. INCANDESCING ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No model. Patented in England Sept. 27, 1881, No. 4,174; in Italy Nov. 9 1881; in France Dec. 5, 1881, No. 145,554; in Canada Dec. 14, 1881, No. 13,835, and in India Jan. 18, 1882, No. 74.

264,656. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 14, 1882. (No model.) Issued Sept. 19, 1882.

264,657. INCANDESCENT ELECTRIC LAMP. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Aug. 30, 1881. (No model.) Issued Sept. 19, 1882.

264,658 to 264,673. REGULATORS FOR DYNAMO-ELECTRIC MACHINES. THOMAS A. EDISON, Menlo Park, N. J. Filed Aug. 7, 1882. (No model.) Issued Sept. 19, 1882.

264,660. REGULATOR FOR DYNAMO-ELECTRIC MACHINES. THOMAS A. EDISON, Menlo, Park, N. J. Filed Aug. 7, 1882. (No model.) Issued Sept. 19, 1882.

264,737. INCANDESCING ELECTRIC LAMP. SAMUEL D. MOTT, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Nov. 29, 1882. (No model.) Issued Sept. 19, 1882.

264,858. STOVE GRATE. ESEK BUSSEY, Troy, N. Y. Filed July 5, 1882. (No model.) Issued September 26, 1882.

264,863. BLOWER FOR FIRE PLACES. BENJAMIN G. COVINGTON, Fort Mill, S. C. Filed May 9, 1882. (No model.) Issued September 26, 1882.

264,866. OIL STOVE. ALFRED S. DINSMORE, Boston, Mass. Filed July 31, 1882. (No model.) Issued September 26, 1882.

264,866. CARPENTER'S VISE. AMOS FALES, Denver, Colo. Filed Apr. 22, 1882. (No model.) Issued September 26, 1882.

264,870 FILTERING APPARATUS. ALLEN FISKE, Portland, Me., assignor of one-fourth to Septimus L. Fisk, Boston, Mass. Filed May 1, 1882. (No model.) Issued September 26, 1882.

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The Board of Health of Boston has issued the following order:

WHEREAS, the diseases designated as small-pox, scarlet fever, diphtheria, and typhus fever are contagious and dangerous to the public health, and have been, and may easily be contracted at funerals from dead bodies or apartments which have been infected by such diseases, it is therefore ordered that from and after this date, no public funeral shall be held over the remains of any person having died of small-pox, scarlet fever, diphtheria, or typhus fever, without the written permit of the Board of Health; and under such regulations as may prevent the spread of either of said diseases.

Ordered, further, that the remains of persons dying of either of said diseases shall at once be placed in a tight or sealed coffin, and shall not thereafter be exposed to view or disturbed except for burial.

Extract from Carriage Ordinances of the City of Boston.

"SEC. 24. No owner, driver, or other person having charge of any hackney carriage or other vehicle used as a public conveyance, shall receive, or permit to be placed, or convey in any manner, in or upon said carriage or other vehicle, any person sick or infected with the small-pox or any other contagious disease, or the body of any person who has died of small-pox or any other contagious disease, under penalty of forfeiture of his license."

The Board of Health directs special attention to small-pox, scarlet fever, diphtheria, and typhus fever as being contagious, dangerous to the public health and within the meaning of the above ordinance.

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and leave it to others to furnish adulterated spices, if any are required. We some time since dropped from our list the Griswold's O K and I X L brands, retaining the "*Thurber's S. I.,*" and "*Massasoit Mills*" brands, the former being an extra grade of the finest, freshest and strongest spices, especially Selected and Imported, hence the brand (S. I.), for the finest trade; while the "*Massasoit*" brand will represent strictly pure goods of good quality. Both of these brands will be put up *full weight*, thus heading off another swindle frequently perpetrated upon the consumer, and to meet the demand which may legitimately exist for a package of spice for a small amount of money, we have concluded to put up, in addition to the larger size, *a two-ounce round tin, with sifting top*, which we guarantee contains more real value than the usual four-ounce tin of adulterated spices, the only condition necessary in the use of pure spices being to use less of them.

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A report on the Sewerage of Concord, by Edw. S. Philbrick, C.E., instructive to town authorities generally.

Remarks by John S. Billings, Surgeon, U. S. Army, before the Academy of Medicine, New York, on sewer gas and the value of modern methods for excluding it from houses. This article throws considerable light on a question generally misunderstood.

Electric Lighting; its Fire Risks and their Remedies. Two articles by Prof. Henry Morton, President Stevens' Institute of Technology, Hoboken, New Jersey,

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The sixth volume of THE SANITARY ENGINEER includes the 27 issues from June 1 to Nov. 30.

The following are a few of the many articles of permanent interest:

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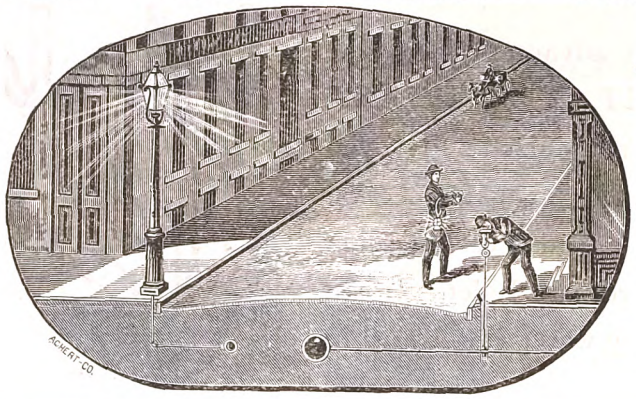

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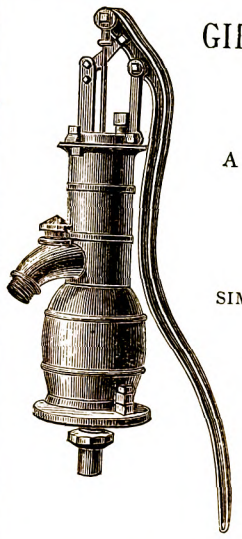

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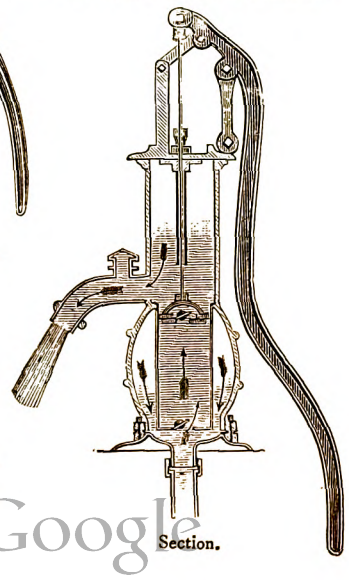

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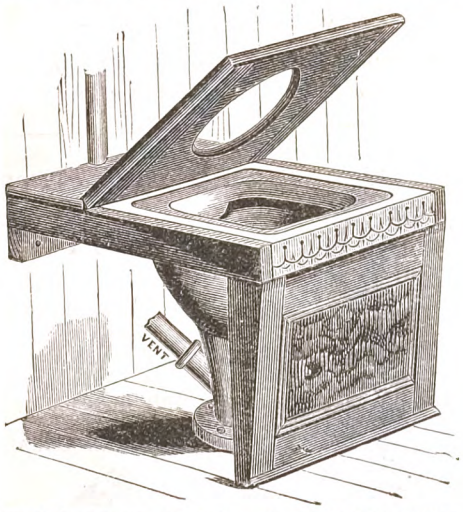

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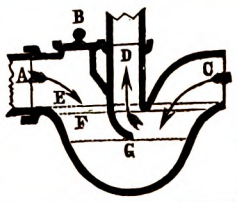

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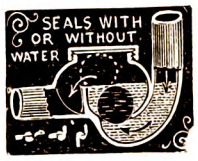

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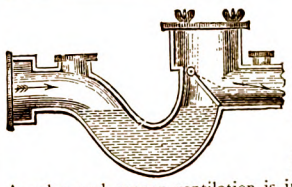

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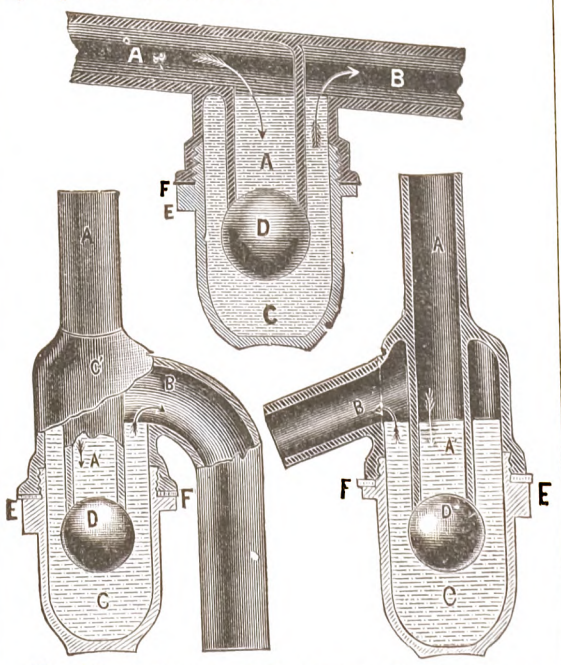

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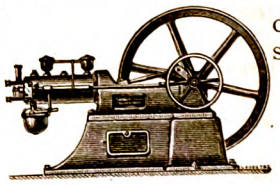

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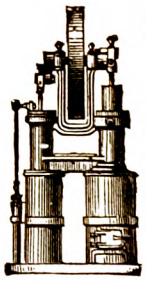

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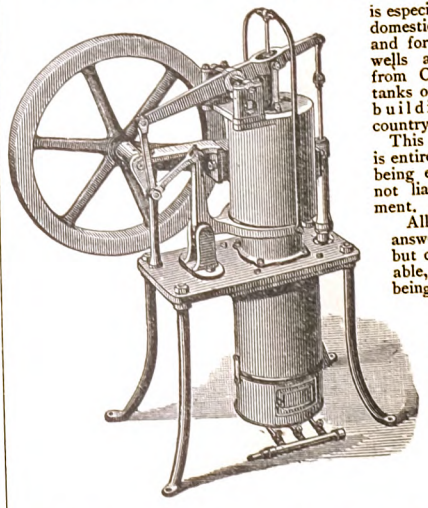

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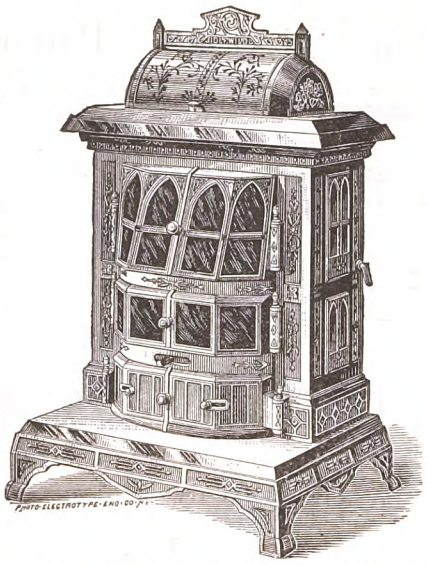

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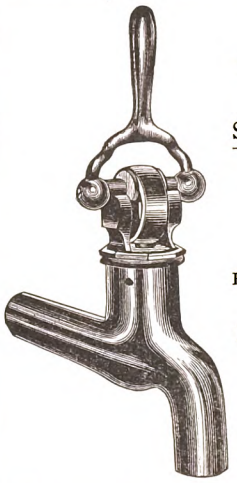

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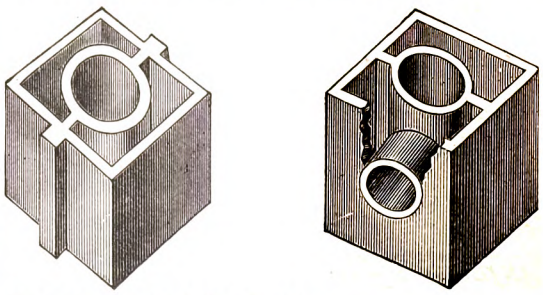

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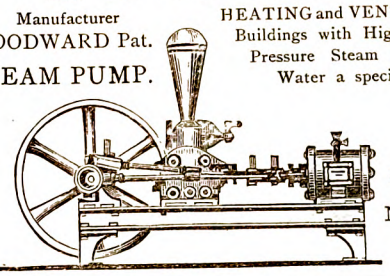

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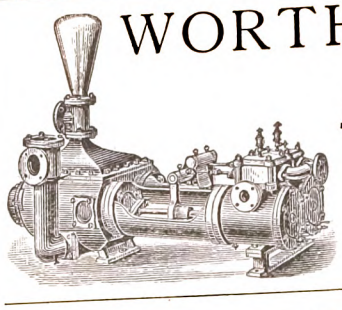

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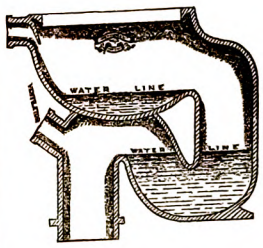

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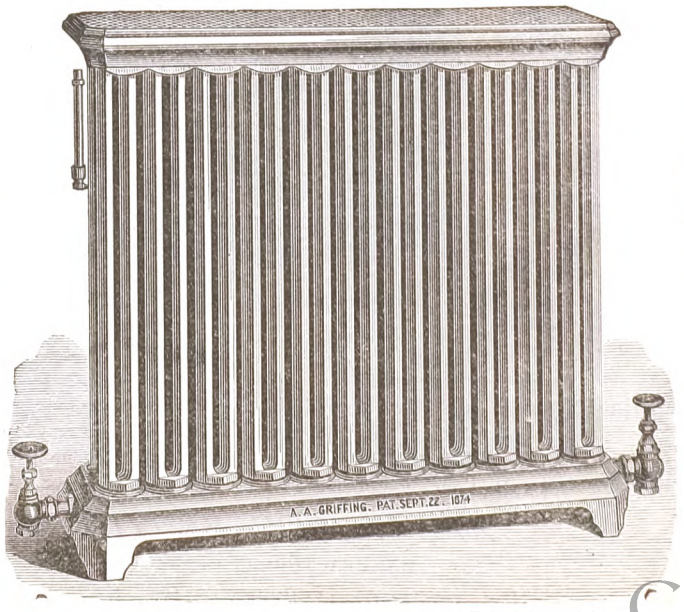

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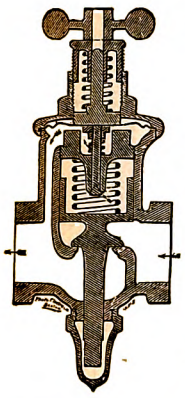

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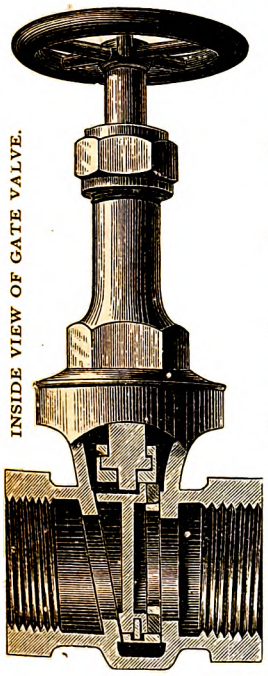

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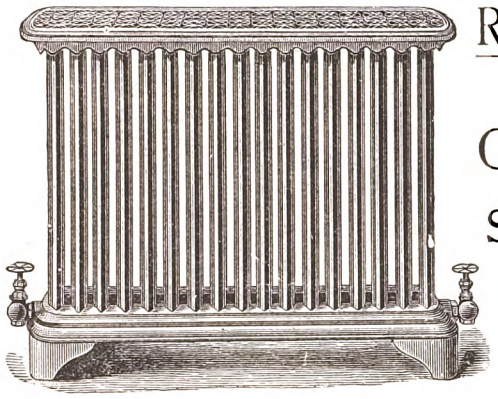

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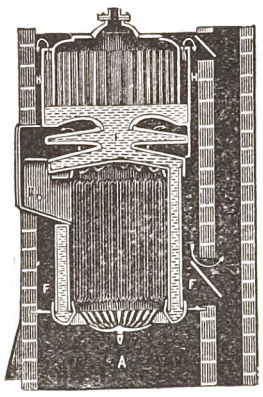

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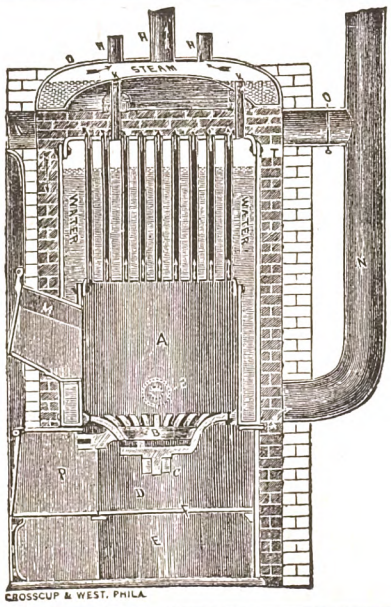

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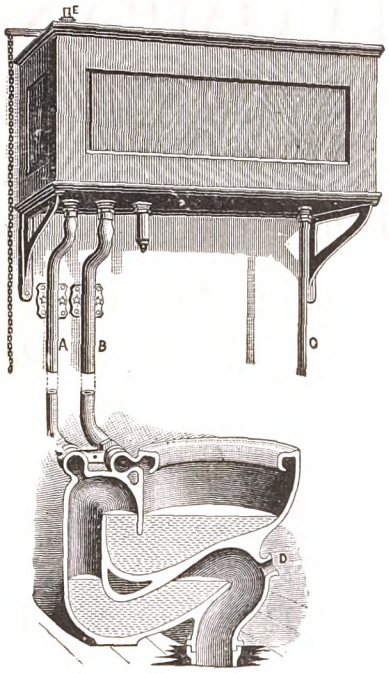

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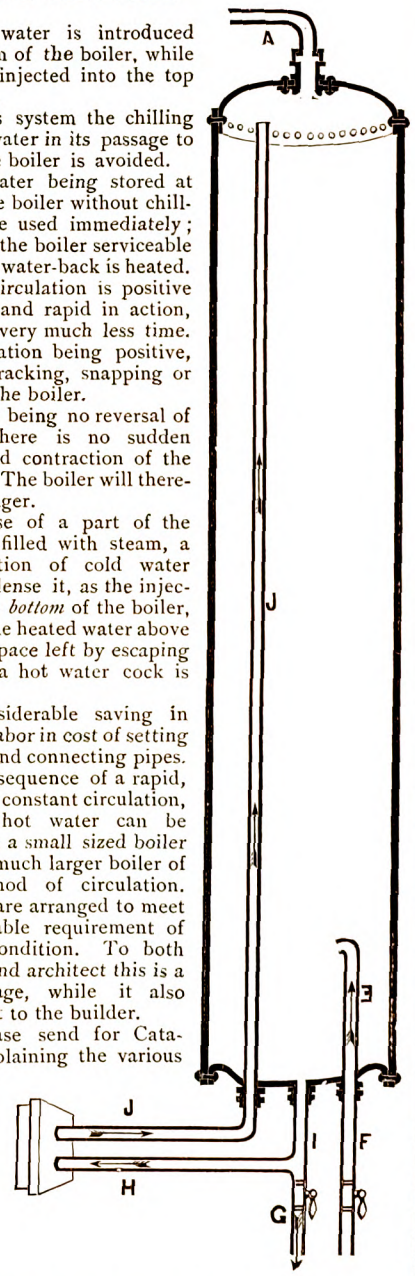

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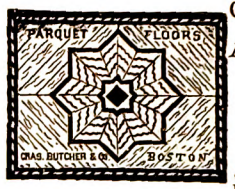

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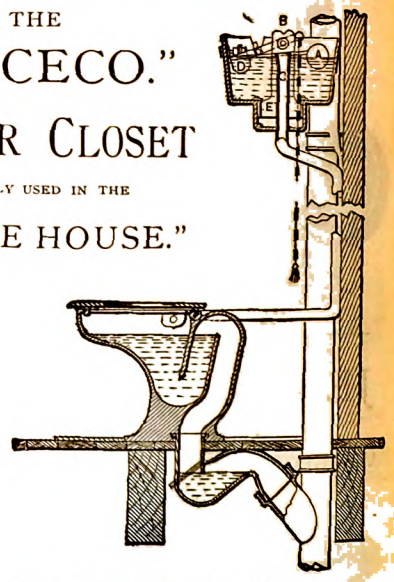

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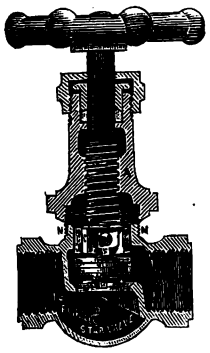

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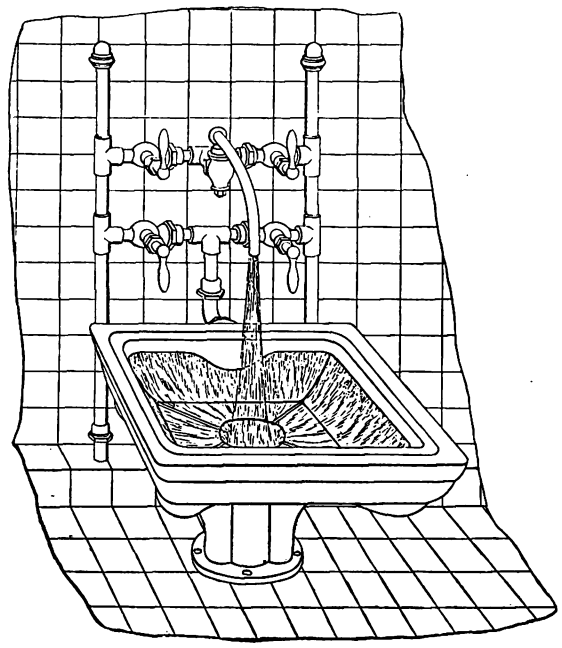

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THE COMMANDMENTS OF "THE SANITARY ENGINEER."

I. Thou shalt not worship any patent fixture, or system, or process.

II. Thou shalt not darken sanitary counsel by words without knowledge.

III. Thou shalt not be dirty—either as to thy person or thy house.

IV. Thou shalt not make false statements, either to get gain or to secure reforms.

V. Thou shalt sustain thy sanitary authorities in their fights against the miserly, the ignorant and the uncleanly.

VI. Thou shalt not eat uncooked meat.

VII. Thou shalt not befoul thy neighbor's drink, or his air, or his food, or anything that is thy neighbor's.

VIII. Thou shalt be vaccinated, thou, and thy wife, and thy children, thy man-servants, and thy maid-servants.

IX. Thou shalt not worry, or fret thy gizzard; either over that which thou canst help, or that which thou canst not.

X. Thou shalt read THE SANITARY ENGINEER, and profit by the same, and cause thy neighbor to do likewise.

MALARIA.

The subject of malaria and its causation is becoming increasingly important from the business point of view as well as from that of the physician and sanitarian.

The question as to the dependence of malarial fevers upon the presence of mill dams may involve large commercial interests, as in the recent trial in Massachusetts, thus bringing it before the courts, and then something more than hypotheses and conjectures are necessary.

The prevailing scientific opinion at present is that malaria is caused by micro-organism, and several observers claim that they have demonstrated the particular germ. Unfortunately each one has found a different form, while a number of competent observers have not as yet found any form which they are willing to accept as the specific germ.

We have thought that our readers would be interested in a statement of what is really known on this matter, and what is as yet mere conjecture, and have, therefore, induced Dr. George M. Sternberg, of the United States Army, who has made a study of this subject for the National Board of Health, to prepare for THE SANITARY ENGINEER a series of papers, the first of which is given in this number.

When the publication of these papers is concluded we may have some comments to make. At present we need hardly assure our readers that Dr. Sternberg is good authority on the subject of which he writes.

THE EMPLOYMENT OF PHYSICIANS AS SANITARY ADVISERS.

Dr. W. F. Phillips, of Andover, England, has, during the last two years, addressed several communications to medical journals on the systematic prevention of disease by medical men, and has now presented his plan to the public in a little pamphlet entitled "A Plea for Medical Providence, and the Prevention of Disease in General Practice." Taking the ground that "at present the interests of the medical profession and of the public are opposed, that is to say, the greater the amount of illness, the better it is for the doctors," he proposes, as the simplest remedy for this state of things, the following:

Let any person, for himself, or herself and family, go to a medical man and ask him to accept a sum of money agreed on for the year, to furnish attendance and advice, it being understood that midwifery, the treatment of fractures and dislocations, and all serious injuries resulting from accident and surgical operations, involving much trouble, shall be considered as extras, to be paid for as at present. The annual payment would vary from $2.50 to $10 or more for each individual, according to circumstances. The advantages of this scheme are very clearly pointed out, and it would seem that Doctor Phillips has made practical trial of it in his own neighborhood.

We should like to see it fairly tested in this country, but we fear that at present there might be some difficulty in finding a large number of physicians who are sufficiently familiar with sanitary matters to make their advice as practically useful as it should be, and we also doubt whether competent physicians of good repute would be willing to make such a contract.

THE MAYOR'S ANNUAL MESSAGE.

The inaugural message of Mayor Edson, of this city, shows that in the interval between his election and the assumption of his duties, the late President of the Produce Exchange has been pretty thoroughly occupied in the investigation of the complex affairs of the new and evidently unfamiliar business upon which he has entered. His statistics, gathered from the various departments are undoubtedly correct, and are not particularly interesting. His recommendations, where they have evidently emanated from the experienced officers of departments, are not injudicious. But when he enters upon the consideration of subjects with which his previous training and duties have not made him familiar and ventures to make suggestions "out of his own head," he displays a want of knowledge that is, to say the least, unfortunate in a prominent public officer, at the outset of his career.

In alluding to the construction of a new aqueduct, he says, "It would, in my opinion, be wise, before finally adopting any plan, to have the opinion of *business men*" (the italics are our own) "as well as engineers, concerning its practicability, the probable cost, and the time required for construction. The execution of whatever

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plan may be adopted should be surrounded with safeguards against extravagance or unnecessary expenditure; to this end I believe you will join me in the recommendation that to a controlling extent the work be supervised by men of known integrity, who possess some practical knowledge of such matters."

In the first place, the making of a distinction between business men and engineers is needless. If there is any class of men who are pre-eminently *business* men, and who are accustomed by their daily training and their daily work, to the management of large affairs, it is civil engineers. The skill, the promptitude, the breadth of view, the mental grasp demanded in the prosecution of the great works which come under the control of the engineer, and the multifarious questions which daily and hourly arise in his practice, are far more than are required for successful speculation in the street or the exchange. There are, of course, all grades of engineers as there are all grades of merchants, lawyers and physicians, and an able man in any one of these professions may be a better judge of the proper course to pursue in a certain case than a man of low attainments or skill in the profession, particularly relating to that case. But that is no reason why in a case involving great questions of constitutional law, of surgical practice, or of hydraulic engineering design and construction, the opinion and advice of so-called business men should be called for as to the practicability and advisability of what a Storey, a Wood or a Stephenson recommended. If there were more attention paid to professional advice and less to the crude opinions of the men of miscellaneous avocations who happen to get into office, our public works would cost less and be better managed.

As regards the supervision of construction, the selection of men of "known integrity" is certainly desirable, but when his Honor talks of their possessing "some practical knowledge of such matters," he betrays his want of knowledge of his subject and his lack of appreciation of the difficulties of getting good work done. It is the men with "some practical knowledge" that are the curse of engineering work. Their presence on a managing board involves invariably a weakening of the engineer's authority and a strengthening of the contractor's hands in slighting his work. There must be no divided authority.

In mentioning the tearing up of the streets by the steam heating companies, the commercial element is brought into prominence again by the mayor, in his remark that "here would seem to be an opportunity for some person of enterprise, or for some private corporation to mature a plan for underlaying the streets with a single excavation, which shall provide not only for the water, gas and steam pipes, but also for telegraph and telephone wires and other appliances which the public convenience may hereafter require. The space under the streets would thus become as susceptible of benefit to the citizens as rapid transit has made the space above the streets." This is a remarkable suggestion for the chief officer of the city to make. If the "self-government" that he so pathetically calls for in another part of his address, is to consist in handing over all the rights of the public in the thoroughfares to enterprising individuals and private corporations who do as they please, the less "self-governed" New York is, the better will we be off. A subway for all pipes and wires is unquestionably desirable, but it ought never to be given over to private control. From house line to house line, and from the centre of the earth to the clouds, the public streets should be controlled by the public.

QUARANTINE FEES.

The New York *Times* of Jan. 3d contains the following:

NEW ORLEANS, Jan. 2.—Some time ago Morgan's Louisiana and Texas Railroad and Steamship Company applied for an injunction restraining the State Board of Health from collecting charges imposed by the Quarantine laws upon vessels entering the port of New Orleans, and from detaining their vessels on account of the non-payment of these quarantine fees. The company claimed that the laws under which the fees are demanded were in conflict with the Constitution of the United States in their several respects. In the Civil District Court to-day Judge Monroe delivered a long decision in the case. In concluding his opinion he said: "It is remarkable, in view of the fact that the convention which adopted the Constitution of the United States distinctly determined, after the most elaborate and earnest discussion, that the States should not be allowed without the consent of Congress to levy duties on tonnage for any purposes whatever, that it should still be considered a matter of discussion as to whether such duties may not be imposed for the support of a police or quarantine regulation established by a State for the protection of the health of its citizens. There is no reason for requiring that the quarantine service should be supported by those who are under no legal obligation so to do." The injunction was made perpetual restraining the Board of Health from the collection of quarantine fees. This will be a fatal blow to the local health board, as a pay-roll of some 20 employés has been maintained on these collections, and the State and city have made no provisions for the maintenance of the board.

This is a matter of much importance and the decision, if sustained by the Superior Courts to which it will probably be appealed, will affect many other ports besides New Orleans, and may require a change in the system of the Port of New York.

New Orleans has used her quarantine to make money to pay expenses which the city should itself meet, and the Board is not likely to meet with much sympathy. When we get the text of the decision we will return to this subject. Meantime we will only say that we think all quarantine inspections should be free of cost to the vessel.

We are now able to congratulate Boston plumbers and citizens on the final passage of the ordinance regulating plumbing in that city. By an oversight, which we mentioned last week, this ordinance having been once before passed by the City Council, was omitted from the Revised Ordinances. It was taken up and passed again by the Council at their session of the fourth inst.

Montreal, Canada, also seems to be on the point of adopting a system of official regulation of plumbing and drainage. For several years a city by-law for the regulation of the public health has been under discussion. It has been finally completed and submitted to the Board of Health. Chapter II, which is chiefly devoted to the proper construction and management of buildings, contains two sections on plumbing and drainage which allow plumbing to be done only by licensed plumbers, and define in detail what may and what may not be done in constructing plumbing and drainage work. So far as we can judge from the Montreal press, the by-law receives general support and is likely to be adopted.

PLUMBING OF THE BROOKLYN PRIVATE SCHOOLS.

The special examination by the Brooklyn Health Department of the plumbing in the private schools of that city is nearly complete. Up to the close of last week Commissioner Raymond had received reports of 109 examinations. Of this number 41 show defective work. The nature of the defects in each case we hope to present in detail hereafter. The number of pupils in attendance at each school and the number absent from sickness at the time of the inspection was also ascertained. In the 109 schools reported on there were 4,107 pupils in regular attendance, of which number 77 were absent from sickness of all kinds, one-seventh being from contagious diseases, as follows: whooping-cough seven, chicken-pox two, and scarlet fever two. The above number of schools examined does not include the parochial schools nor the large Packer Institute, the plumbing of which was reconstructed during the past summer in accordance with the law.

LETTERS TO A YOUNG ARCHITECT ON VENTILATION AND HEATING.

BY JOHN S. BILLINGS, SURGEON, U.S.A.

No. XLII.

I come now to speak of a class of buildings in which the subject of ventilation has received more than the average amount of attention on the part of architects—namely, hospitals.

The necessity of providing these buildings with more than the usual means of ventilation has been recognized for a hundred years or more, and in almost every large hospital which has been planned or built during the present century some attempt has been made to provide it. Yet in spite of the experience thus gained, and of some careful studies by physicians, engineers and architects, as to the relative merits of various systems it must be confessed that the results obtained have too often been unsatisfactory.

The bad results of imperfect ventilation or of an impure air supply are more strikingly evident in hospitals than other buildings, owing, in part, to their continuous occupation, in part to the lowered vitality of their inmates, which makes them specially susceptible to unsanitary influences, and in part to the presence of special causes of disease in the form of germs or miasms. The great difficulty in providing a constant and

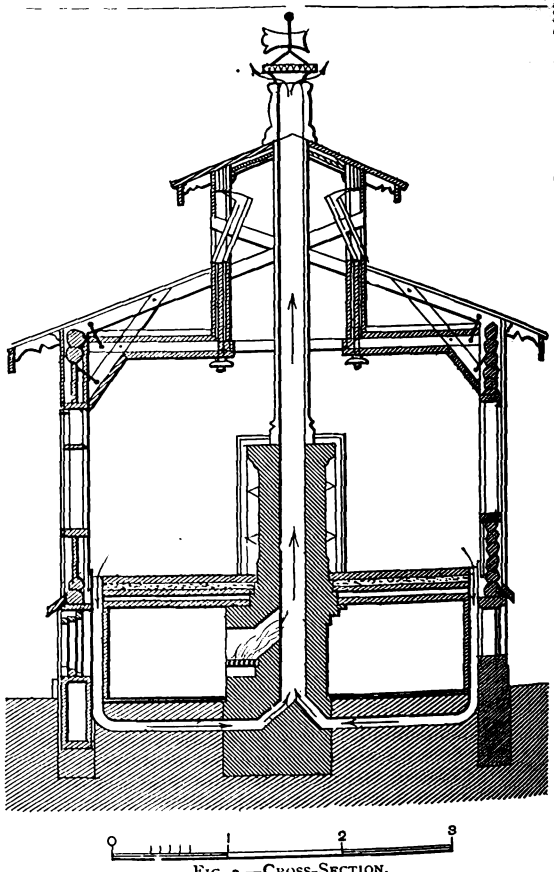

FIG. 3.—CROSS-SECTION.

sufficient supply of pure air to hospital wards, in such a way that at all hours of the day or night, at all seasons or in all conditions of wind, they shall be free from all odor, and comfortable for the patients, is not so much a want of knowledge of the means by which this may be effected as it is the expense which must be incurred, not only in providing the necessary construction and apparatus for heating and ventilation, but also to keep the system in operation after it has been provided. This expense is almost invariably underestimated, and those who have to furnish the funds for the support of the institution are disappointed accordingly, and in attempting to reduce the cost are too apt to reduce the ventilation also.

The hospitals for which an architect is liable to be called on to prepare plans may be roughly divided into four classes. The first are those intended for the reception of contagious diseases, the so-called pest houses. These are usually

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cheap temporary structures, hastily erected to meet an emergency, and the architect is rarely consulted with regard to them. It would be much better if he were, for such hospitals should be considered as an indispensable part of the municipal mac: inery of every city of 10,000 inhabitants and upwards; they should be carefully constructed while the emergency is yet afar off, and while they should be simple and cheap, they should have a neat and attractive appearance instead of looking, as they usually do, like an enlarged dog kennel. Their ugly, box-like appearance can be substituted by a simple, broken, cottage-like outline without much additional expense, and they will then be considered as worth taking care of. They will be one story wooden buildings, with wards containing about six beds, heated by a stove in the centre. Through or around this stove the greater part of the fresh air should be introduced in cold weather, while the foul air should be removed by a shaft reaching nearly to the floor near the stove, and containing the stove pipe in its upper part. The amount of air supply should not be less than one cubic foot per head per second. Upon a larger scale this kind of building is known as a barrack hospital, and excellent results have been obtained from it. To illustrate its possibilities I give figures showing plan and cross section of one of the barracks of the Roschdestwensky City Hospital in St. Petersburgh.

This hospital has three of these barracks, constructed in 1871–72, and they have proved to be a great success, being comfortably warm in the extreme cold of the Russian winter, and giving excellent results in cases of typhus and also in surgical cases.

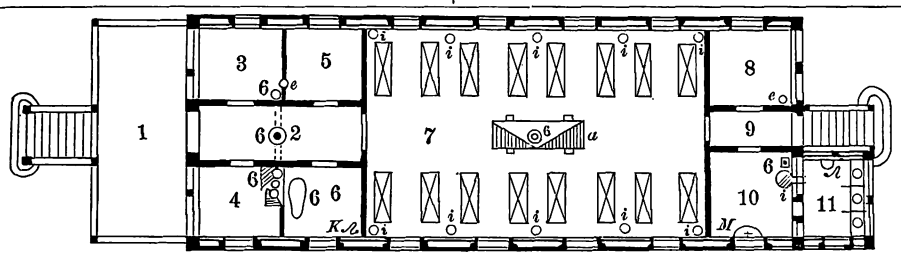

FIG. 1.—FLOOR PLAN.—1, Porch. 2, Hall. 3, Nurses' Room. 4, Ward Kitchen. 5, Room for two patients. 6, Bath. 7, Ward. 8, Room for two patients. 9, Hall. 10, Wash-room. 11, Water Closet.

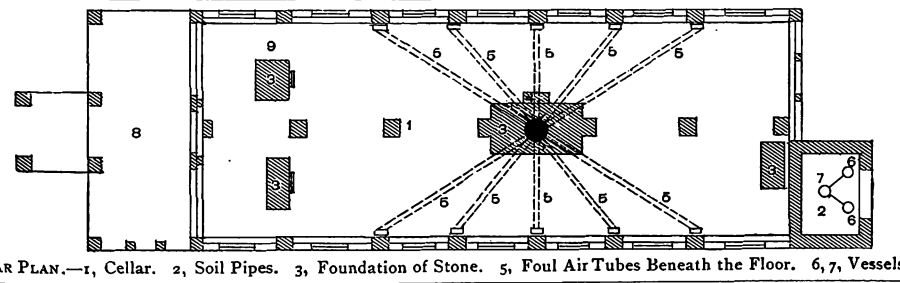

FIG. 2.—CELLAR PLAN.—1, Cellar. 2, Soil Pipes. 3, Foundation of Stone. 5, Foul Air Tubes Beneath the Floor. 6, 7, Vessels for Excreta.

The walls of this barrack are triple, enclosing two air spaces. The arrangement of the ward heating and ventilation is sufficiently shown in the figures. The great central German porcelain stove is 14 feet long, four feet eight inches wide and six feet high. This so-called stove is rather a furnace, fired from below, and has through it eight openings for the admission of fresh, warm air into the ward. The foul air flues open into the central smoke flue as shown in the cross-section. Besides this central stove there are three others, and the whole furnish about 103,000 cubic feet of fresh air per hour. When the external temperature is not below the freezing point these stoves are fired but once a day. When between zero and 32° F., they are fired twice a day, and when below zero three, and in extreme cold four times a day. When I was in this ward in August, 1881, it was quite free from unpleasant odor, although it was filled with fever cases—the day was cold and raw, but the temperature of the ward was all that could be desired. It is an interesting hospital, as proving that even in the coldest climates such wards can be made perfectly comfortable and be at the same time kept well ventilated.

(TO BE CONTINUED.)

TENEMENT HOUSES IN AMERICA.

BY A CONTRIBUTOR OF THE LONDON LANCET.

It is popularly supposed that in the large towns of America there are no poor, in the English meaning of that term. This is, however, a great mistake, and as a matter of fact some American cities contain as degraded specimens of the class of people to be found in tenement houses in Great Britain as will be met with anywhere in the world. It may be interesting to inquire how it is that in the New World, where labor is at a premium, and where there is more work to be done than hands to do it, no improvement has taken place in that class of persons who inhabit tenement houses. In a town like Chicago, which has been nearly rebuilt during the last ten years, the cause of the existence of the worst class of tenement house is due to the fact that the enormous number of emigrants who annually enter the capital of the West far exceeds the capacity of builders and capitalists. Hundreds of new houses are erected annually, but an influx of 60,000 or 80,000 emigrants renders it impossible to provide suitable house room for all. In spite of many difficulties, however, it must be confessed that the health authorities, under the energetic superintendence of Dr. De Woolf, the able Commissioner of Health, have done great public service. Mainly at their instigation, and in spite of considerable opposition from various quarters, powers have been conferred upon the health authorities which, as they are vigorously exercised, have proved the greatest boon to the inhabitants of Chicago. The following are the chief sections of an Act for the regulation and inspection of tenements and lodging houses and other places of habitation, which was approved and put in force on and from May 30, 1881. The Act applies to all incorporated cities of 50,000 inhabitants within the State of Illinois:

1. Architects, builders, or other persons interested in any projected tenement, lodging house, or other place of habitation, must submit plans and specifications of any such building to the Health Commissioners, to enable them to examine, approve, or reject the same, unless or until adequate provision is made for the ventilation of rooms, light, and air shafts, windows, ventilation of water closets, drainage, and plumbing.

2. Every plumber interested in the plumbing work of such buildings must receive from, and proceed according to the specifications and written instructions of, the Health Commissioners before commencing work.

3. The plumber is compelled, after the completion of his work, and before any portion of it is covered up, to notify the commissioners in writing that the buildings are ready for inspection, and it is unlawful for any person interested to cover up or in any way conceal such plumbing work in or about any such buildings until the Health Commissioners have approved it.

4. Provision is made to impose a penalty for every such offence of from £20 to £40 upon any architect or builder who fails to comply with the foregoing regulations.

5. A similar penalty is imposed upon plumbers in case they fail to comply with the law, together with a further penalty of "£2 for each and every day such plumbers shall, after first conviction, neglect or refuse to obey the Act or the written instructions of the Health Commissioners," with a forfeiture of his license to do business in the said city for one year after conviction for a second offence.

With the view of facilitating the application of the above Act various printed forms have been prepared by the Health Department, which provide (*a*) plans for ventilation, light, plumbing, and drainage; (*b*) permit signed by Health Commissioner, sanctioning the erection of buildings on the following or some special conditions in certain cases: (1) Every habitable room must have at least one window opening directly upon the street or yard, or upon a court or light shaft. (2) Every light and air shaft for habitable rooms must be at least 12 square feet in area for a three story house, 16 square feet for a four story house, and 20 square feet in area for a five story house; and in every case not less than two feet wide in the clear. Shafts between two houses and common to both must be double this area. (3) All windows which open on shafts shall be hung with weights, so as to slide vertically, each window being not less than 12 square feet in area. (4) Water closets shall not be ventilated by a shaft which ventilates habitable rooms where they do not open otherwise to the external air. Water closets must be ventilated by means of a separate shaft, not less than three square feet in area, to extend above the roof, and to be arranged for the admission of light and air at the top. (5) No alteration in the light and ventilation of the premises (for which a permit is granted) shall be made, except upon the express written approval of the Commissioner of Health; nor shall any additional structure be erected upon the lot without such approval, and a special permit. Printed upon the face of the permit are details of the plan of plumbing, which will be insisted upon by the Commissioner of Health. This plan provides that all materials used must be of good quality and free from defects, and all work must be executed in a thorough and proper manner. All plumbing must be so placed as to be readily inspected. Every soil and waste pipe, iron or lead, must extend through and at least four feet above the roof, be of undiminished size, and provided with suitable top or cap. The house drain, if of iron—a material much used for these pipes in America—shall have a fall of at least half an inch to the foot, and be provided with a proper trap near the street, and with an inlet for fresh air inside the trap. It should run along the cellar walls—a favorite plan in America—and never be hidden underground. All iron soil pipes must be sound, free from holes, of a uniform thickness, of not less than ⅛ inch for a diameter of two, three, of four inches, or $\frac{5}{32}$ inch for a diameter of five or six inches. Before connection they must be thoroughly coated with coal-tar pitch, inside and outside, which must be applied hot. All joints in the soil and waste pipes must be so caulked with lead, or cement made of iron filings and sal ammoniac, as to make them impermeable to gases. When the house drains are not of iron they must have twice the above given internal diameter and half the grade, unless in special cases specially sanctioned. Every sink, drain, water closet, and tub, or set of tubs, must be separately and properly trapped. When a lead pipe or trap is connected with an iron pipe the joint must be made through a metallic sleeve or ferrule, and be caulked with lead. All traps must be ventilated by a special pipe entering above the roof.

Every "safe" under a basin, bath, or other fixture, must be drained by a special pipe, not directly connected with any waste pipe, drain or sewer. Every water closet must be supplied with water from a special cistern, and not direct from the main. No overflow pipe from the cistern to be directly communicated with any soil or waste pipe or drain. No cistern for drinking water to be lined with lead.

It is stated that wrought iron, steam fitted, glazed pipes are the best for house drains, and their use is recommended. When the work is completed, and before it is covered up and the house occupied, the Health Department must be notified, to enable the authorities to send an inspector, upon whose report the Commissioner will act before its final approval. Equally stringent regulations are enforced in respect to the existing or old tenement houses, which are regularly inspected by a staff of trained officials, and it may be said with truth of Chicago that there, if anywhere in the world, the life of a jerry builder, or plumber, or owner is not a happy one.

For this reason, and as a guide to those who are striving for improvement in these matters in England, the above regulations and information cannot fail to be of interest. The whole plan of administering the Health Department of Chicago has been admirably conceived, and is being ably administered by Dr. De Woolf, the present Commissioner of Health. I would advise anyone who desires to have a model set of forms and regulations for controlling the health arrangements of a large town, to write to Dr. De Woolf for those in use at Chicago. It is not a little surprising to find that whereas wages are exceedingly high throughout America, salaries, and especially the remuneration of the health officers, are unusually small and inadequate.

At Boston, Mass., during the last ten years much has been done to secure the health of the inhabitants. It is to be regretted, however, that up to the present time the Health Commissioners have had no control over the sanitary arrangements and construction of habitable houses within that city. In consequence, although the Corporation have established a separate building authority to which all plans are referred, the sanitary arrangements of many Boston houses leave much to be desired in the interests of the health of the townspeople. It is always unwise to have a divided responsibility, and in any case where matters of health are concerned, to separate the supervision and control of the sanitary condition of habitable houses from the Health Department, is almost, if not quite, as foolish as to attempt to separate the dieting of a patient from the control of the physician who has charge of the treatment of the disease from which he is suffering. It is surprising to find this fatal administrative mistake in a city like Boston, which is certainly entitled to rank high amongst American towns for its culture and sound public life. Doubtless attention has only to be called to the subject to ensure its immediate rectification. Nothing could be more detrimental to the best interests of the citizens than this divided responsibility, and the sooner it is altered the better it will be for the health of the city. Great praise is due to the Board of Health for the good sanitary work they have done in Boston during the past ten years. Few, if any, cities have better quarantine arrangements, few have officers more imbued with a genuine enthusiasm for their work, few take greater

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precautions to ensure the health of all classes, and no American city keeps its streets and thoroughfares cleaner or in better order. Still, when all this is said, something remains to be done, and it is not a little remarkable to find that in its regulations for the construction and maintenance of tenement houses Boston is much behind Chicago. Indeed, the whole of the statutes and ordinances relating to the public health of Boston might be overhauled and supplemented with advantage. In some cases they are contradictory. Thus, it is provided by article 106 that no cellar dwelling shall be occupied which has more than half its entire height below the level of the street, whereas section 113 enacts that a cellar may be occupied providing at least one foot shall be above the same level. Again, the conditions upon which tenement and other houses are allowed to be built require amplification and revision, as at present they leave much to be desired. The existing tenement houses in Boston may be divided into three classes—(*a*) undesirable, (*b*) fair, (*c*) good. With a population of nearly 400,000, Boston has some 20,000 or 25,000 people who occupy tenement houses, and of these some 10,000 inhabit the grade of house here classed as undesirable. A building known as the Crystal Palace may be taken as a fair specimen of the first type. It has accommodation for thirty-eight families, and is occupied on an average by some twenty-five only. The tenants pay for one fair-sized room and an annex or large cupboard with an opening into the air shaft, from 5*s*. to 6*s*. per week. On every landing there is a sink common to all on that floor, and a supply of cold water. There are no water closets, but three very dirty and badly-kept privies, unlocked, and open *tout le monde*, are situated outside and behind the house. The house itself is not clean, and is old and in bad repair. Still it is fair to say that the present condition is not nearly so bad as formerly, it having been occupied by no less than 100 families some years ago.

At present there is no overcrowding, although the state of affairs when 100 families existed here must have been horrible indeed. The present occupants are nearly all Irish, for the most part rag-pickers by trade, who are certainly, notwithstanding their dirty condition, far cleaner here than I have found them at home—in Dublin, for instance. This house is owned by a respectable man, who rarely, if ever, visits it, for the reason that he has sublet it for $1,376 per annum, say £275. If he came there once a week, probably he would pull down the house, or at any rate keep it in better repair. No. 190 Kneeland street may be taken as a good example of the second class of house. It is owned by a publican of good standing and respectability, who takes some interest in his property, refuses to sublet, and manages it himself, through a janitor, who collects the rents, and resides on the premises. It contains twenty-five families when full, and is in many respects far cleaner and better kept than the Crystal Palace. The occupants, too, are more respectable and cleanly, but the rents are very little, if any, higher than those already given. Indeed, there are vacant rooms of a superior kind to let here for which the same rent is asked at the Crystal Palace, although the accommodation at the latter, to say nothing of the unpleasant neighbors, is far inferior to that here offered. This proves that high rents do not keep people in the undesirable class of tenement house, of which the Crystal Palace is a type, but, on the contrary, the people who there crowd together do so from choice, and not from necessity. Further it may be noticed that everywhere the children looked healthy, a fact accounted for by the medical officer's statement that amongst the children it was a case of the survival of the fittest. At 190 Kneeland street the privies are outside the house, the doors are all locked and the whole of them are fairly clean. This was another proof of the admitted fact that to secure cleanliness in these places they must be kept locked, be allotted to certain families only, and so the individual responsibility is easily brought home. This plan works well even in Ireland, and its adoption throughout Boston would be desirable. Columbia Building, Elliot street, was shown as a fair specimen of the best class of tenement house. Its situation is, however, not calculated to promote the health of the inmates, as it is much shut in, and proper ventilation is not therefore possible. In the entrance-hall is a board, called a "directory," upon which are given the names and addresses of the owners and janitor, and the names of the occupants of all the rooms. In the basement are situated a number of cellars; and each set of rooms has a separate cellar allotted to it. The rooms are well-proportioned and comfortable, but the plumbing and drainage arrangements leave much to be desired. The water closets are situated in the centre of the building; they have no communication with the outside air, and the effluvium and sewer gas are preceptible in the living-rooms and entrance-halls, and on the staircase. The rents here are much higher than at the Crystal Palace and Kneeland street. They average from 12*s*. to 32*s*. per week. The occupants consists of Scotch, German and a few Irish mechanics, all superior people earning good wages, and some, at any rate, conscious of the insanitary condition of this house, and the need which exists for structural alterations.

Now, taking these three types of tenement houses and their present condition, it may not be unprofitable to point out where in each case the health authorities might exercise the powers they possess with advantage. At the Crystal Palace no whitewashing has been done for quite twelve months, and Section 116 of the Statutes might be enforced with advantage, as it provides that all tenement house owners shall "whitewash the walls and ceilings thereof twice, at least, every year, in the months of April and October." Both at the Crystal Palace and at 190 Kneeland street. Section 112, regulating the condition of privies and privy vaults, ought to be strictly enforced. It is a little surprising why this has not been done before, especially as the buildings bear evidence of constant inspection in other respects. At Columbia Building, a class of tenement house which appears to be rarely inspected in Boston, the state of affairs is certainly not creditable, and ought to be remedied at once. The building is comparatively of recent construction, and its bad and unhealthy sanitary condition is no doubt due to the fact that the Health Department has no control over the erection of dwelling houses in Boston. This is a state of affairs which calls for alteration, and the sooner the change is made the better. It is true that when a building is occupied it comes under the control of the health authorities, but Columbia Building shows how imperfectly and at what increased expense proper ventilation and plumbing can be introduced *after* completion. If the plans of this tenement house had been submitted to the Health Department before its erection no such evils could have existed. Here is something for Boston people to put right, and the sooner they see to it the better for all concerned.

In New York, up to the year 1878, the tenement house was not only a scandal but a danger to the public health. Even to-day the condition of affairs is not satisfactory, and in spite of the energetic action of one of the most capable of Boards of Health to be found in the United States, much remains to be done. Here, as in Liverpool, the difficulty is to provide suitable accommodation for and to restrain the large floating population which constitute the dregs of the emigrant class. In a tenement house in Mott street, situated almost exactly opposite the offices of the Board of Health, and plainly visible therefrom, is situated a tenement house, or rather houses, which are as bad as anything to be seen anywhere to-day. They are occupied by Italians, but though poor the people themselves are fairly cleanly, and their rooms are at times, considering their surroundings, wonderfully clean. The closets, however, are in a disgraceful condition, and present a spectacle as filthy as the slough of despond itself. This state of affairs could be remedied; it has been vastly improved at Boston, and it is not creditable that New York should long lag behind. Unfortunately there are many of these tenement houses in New York, and little hope is held out of their extinction or removal. Much good has, however, been done since 1878, when the SANITARY ENGINEER drew public attention to the condition of the New York tenement houses, and offered a prize of $500 for the best design for such a building. This competition excited keen interest, and resulted in much improvement. Public attention was aroused, clergy and laity combined to urge reform. A joint committee, consisting of the judges and a committee of the State Charities' Aid Association, was formed, and in the result an amendment to the Tenement House Act was passed by the State Legislature in May, 1879. This Act limited the space to be occupied by any tenement house to sixty-five per cent. of the lot it occupies, required all bedrooms to have windows, with direct light and air, and greatly increased the powers of the Board of Health to remedy the abuses in such buildings. Two associations were formed to erect model dwellings for working men, and several improved tenement houses have been and are being erected by private individuals. No plan can be settled now without the approval of the Health Department, and all plans which fail to meet the requirements of the law are invariably rejected. A visit paid to one of the blocks recently erected by the Improved Dwellings' Association, afforded many satisfactory proofs of the way in which these buildings are appreciated by the class for whom they have been erected. The dwellings of this company are situated on First Avenue, and consist of thirteen houses of six stories each, with basements used as cellars and laundry. There is here accommodation for 218 families in suites of two, three, and four rooms, which are rented at from 8*s*. to 16*s*. per week. There are a laundry, reading-room and bath-house connected with these buildings, and there is ample playground for the children. Care has been taken to make the sanitary arrangements perfect; but a casual visit leads to the conclusion that at present the soil-pipes have to be better ventilated and the drains to be properly disconnected from the main sewer before the health of the inmates is likely to continue good. These buildings were opened in May, 1882, so the managers have had but a short experience of the working. The mortality among the children, of whom 400 have been residents, has been a total of three deaths, and out of 218 sections no less than 157 have been occupied. There is a slight discipline enforced. Irish people, who are unable to give a clean bill of health as to drink, all scolds, and mothers who cannot control their children, are not admitted. The refusals are in practice very few, the night janitor reports all cases of drunkenness, and after two cautions a third offence is visited by a notice to quit. Credit is not given except in case of death or sickness. There are resident at the present time within the buildings twenty-one French Canadian families, who are reported to make excellent tenants and to be very respectable. I wish the project every success, and, judging from what I saw, this association deserves and will obtain it. The great difficulty in New York is the expense of sites, land being so valuable, and this circumstance is likely to delay the erection of an ample quantity of suitable tenement houses.

In Philadelphia there are practically no tenement houses, as here land is plentiful, and it is the fashion for every man to own the house in which he lives. Hence, poverty is rare, thrift is everywhere apparent, and the large number of small houses or pretty cottages fills the visitor with astonishment. It would be a grand thing if every father of a family could own his own house as he does in Philadelphia. This is something for us to aim at accomplishing where possible, and its general adoption would be indeed an approach to the millennium. It is not possible to obtain this in England, but in Ireland and America the general adoption of this Philadelphian system is greatly to be desired.

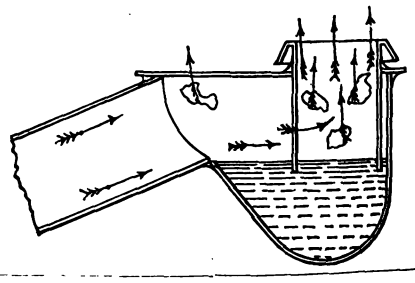
THE MAN-HOLE SCARE.

The outcry against the system of open ventilation of the public sewers into the centre of the streets, says the *Builder*, lately raised, has had a powerful effect in alarming the minds of the general public, whose confidence in such matters is based on the opinions of experts. Its example has caused medical officers of health to be so bold in their statements concerning the evils arising from the gases escaping from the man-holes, that the average member of the community half believes that the sewerage system of our best towns, instead of being the means of carrying disease away from our homes, are actually the carriers of it to our very doors.

The Medical Officer of Health for the parish of Chiswick startled his Board a few weeks ago by stating that he knew of no other cause for a case of enteric fever in the parish than the exhalations from the man-hole-ventilator in the street where it occurred. The Board promptly ordered an inquiry into the case, with a view to knowing whether their sewerage system, just completed, at a cost of nearly 80,000*l*., was really a means of distributing disease and perhaps death. Dr. Corfield, Professor of Hygiene in University College, was called in, and has presented his report on the case. The man-hole-ventilator alleged to be the cause was about 40 ft. from the house in which the case occurred. Inside the house he found that the scullery sink-stone was connected directly to the sewer, and that the only protection from the in-rush of gas into the house from it, was a small bell-trap with a water-seal of at most ¼ in. When he removed the top of the trap, and held a lighted wax match over the mouth, the indraught was sufficiently powerful to cause the flame to flicker violently. He further found that the water service was intermittent, and that one cistern alone supplied the water-closet and the taps inside the house. He stated that, in his opinion, the disease was more probably caused by the sanitary defects inside the house than by the exhalations from the man-hole.

CORROSION OF UNVENTILATED PIPES AND TRAPS.

The accompanying sketch from the *Sanitary Record* shows the corrosive action of the pent up gases in unventilated plumbing. This lead (D) trap, still much used in England, though condemned by the best plumbers and sanitary engineers, was fixed below a water closet, without ventilation of trap or soil-pipe. It will be seen that it is much eaten away.



OFFICE WATER CLOSETS.

During the past summer the water closets and urinal in the building in which the offices of THE SANITARY ENGINEER are located were in an offensive condition. The attention of the owner having been called to this fact, he very readily gave orders for the reconstruction of the entire work. A brief account of what was found by the plumbers Messrs. Morton & Bathe, and a description of their reconstruction may be of interest.

Valve pan closets flushed from a tank on the top floor were formerly used. The branch from the soil pipe to the closets had a "dead end" at the last fixture and none of the traps were ventilated. The ends of the lead traps entered iron ferrules in the Y-branches without solder, and several of the hubs were split. There was no means of flushing the urinal and the floor of the urinal-stall was of

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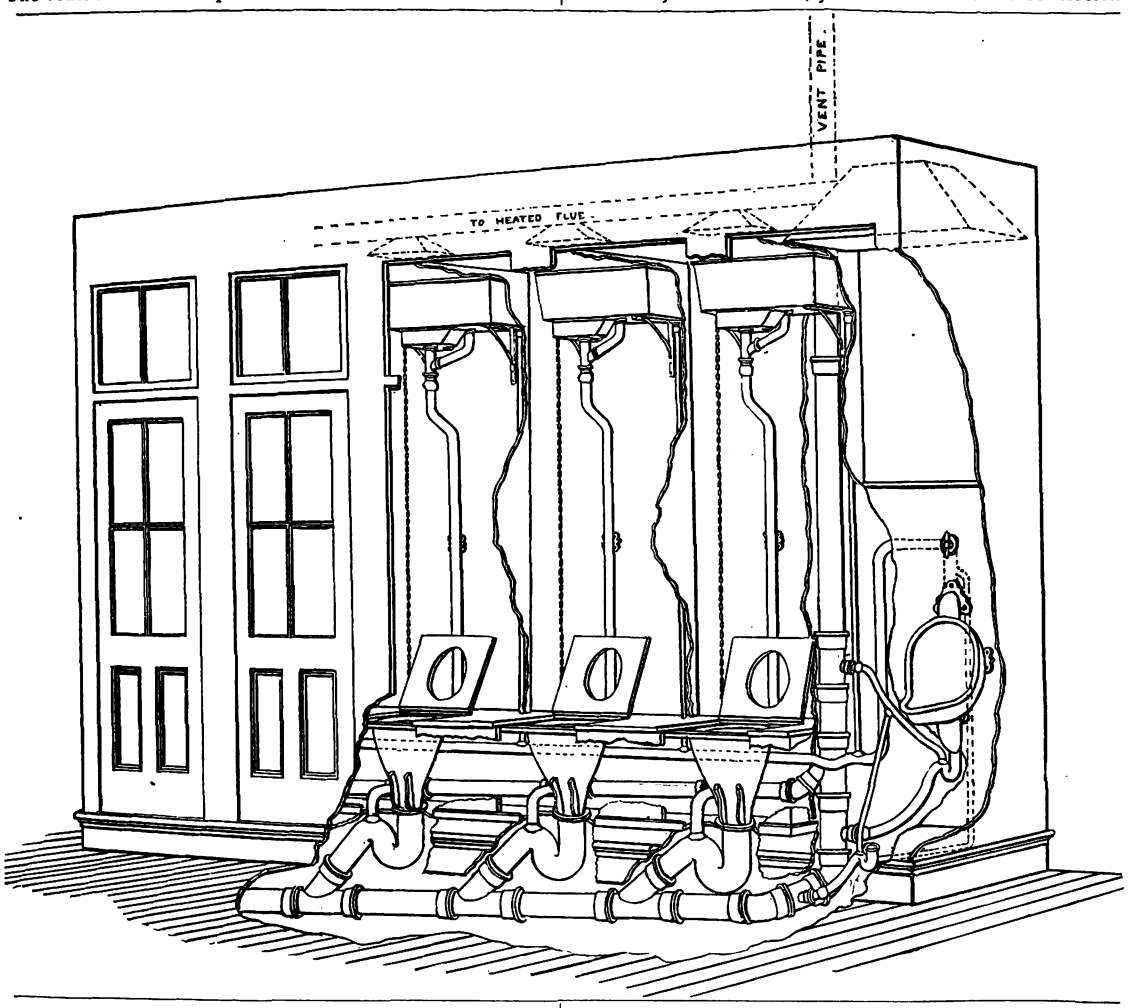
wood. There were no ventilating flues, and the atmosphere about these fixtures was sickening.

The new arrangement is shown in the accompanying sketch. The closets are hoppers with automatic flushing arrangement from separate cisterns. The branch from the soil pipe is extended up through the roof full size and from it a two inch iron branch runs back behind the closets and takes two inch vents from each trap. The urinal stall has marble back, sides and floor. The urinal is flushed through a self-closing cock, between which and the urinal is a branch to supply the trap of the foot waste. The vents from this trap and that on the urinal waste are



larger than shown, being one inch. A tin pipe of about 25 inches in cross-sectional area starts from a hood over the urinal-stall and runs to a heated chimney flue, having two inch by three inch openings over each closet with small hoods attached to each. The sketch is incorrect in not representing openings at the bottoms of the doors about five inches high. The windows over the doors are pivoted at the top and bottom and are generally kept open.

A YEAR OF SANITARY WORK IN BROOKLYN.

The public are aware that much work of sanitary importance has been done by the Brooklyn health authorities the past year. The enforcement of the plumbing law, owing to lack of means, was delayed until last May, at which time it was vigorously entered upon; the question of the pollution of well water in cities has also been investigated; an effort, as we are informed, with considerable success, has been made to prevent the sale of unwholesome meats, and at present the plumbing of the public schools is under consideration and will be made the subject of an early report.

A digest of this year's work is now presented in Health Commissioner Raymond's report to Mayor Low, for the year ending Nov. 4, 1882. The mortality indicates a death rate of 24.97 per 1,000 against 24.83 for the preceding year. A steady increase is observed during the last few years; in 1878 the death rate was 20.85; in 1879, 21.08; in 1880, 23.33; in 1881, 24.83, and in 1882, 24.97. The increase of the death rate over the preceding year is attributed to the great mortality among infants, due to the intense heat the past summer; among persons over five years of age the health has been rather better than last year. On the general sanitary outlook of the city, Dr. Raymond remarks, that "we are favored with a pure and ample water supply and by a situation forming a pure atmosphere—two conditions that are vital to healthful living. These factors, together with the proper development and employment of the sewer system of the city, cannot fail, I think, to eventually reduce the unfavorable mortality roll and place us in the list of the most wholesome of the centres of population."

With reference to the contamination of the wells, Dr. Raymond says that about four years ago the attention of the Department of Health was called to the subject by an examination of thirteen cases of typhoid fever, eight of which were attributed to pump water. While the connection between the disease and the pump water was not absolutely demonstrated, yet in those cases the conclusion seemed irresistible that some such relation existed, and at the request of this Department the Common Council caused the suspected well to be closed. About the same time attention was called to another pump, the water of which was largely used by the children attending one of the public schools. This pump was within ten feet of a cow stable, and the drainage from it flowed toward the well. Chemical analysis revealed the fact that the water was contaminated, and being pronounced unfit for human consumption, the Common Council ordered this well closed. In July the water from five wells was submitted to the chemist for analysis, and his report was such as to condemn them all. Testimony before the Committee on Public Health of the Common Council showed that many of the wells of the city were constructed as long ago as 1850, some even in 1845, and that, situated as they are, alongside the street gutters, it was impossible that they could have escaped contamination. Since that time the water from other wells has been examined, so that we have now the analysis of 43, and of the number 39 or 90 per cent. have been found unfit for human consumption. Since January, 1881, 21 have been closed and the others that have been condemned are now awaiting the action of the Common Council. Since public attention has been directed to the matter, requests have been made by citizens and physicians for chemical analyses of water suspected to have been the cause of severe and, in one case, fatal sickness. The analysis demonstrated that the water was contaminated, probably with sewage, and could well have been a factor in the production of the illness.

The enforcement of the plumbing law has already, in the Commissioner's opinion, produced the most beneficial results. Up to that time there was no restriction as to the manner in which plumbing should be done, and the builder and the plumber had no difficulty in palming off upon the public work which was constructed without the least regard to anything except a quick job and a speedy return of the money invested. Some of the most recently constructed houses were found without traps and with open joint pipes, a constant invitation to disease to do its decimating work. Happily, all this is changed, and we now find a class of plumbing which is equal to the best that modern science and art can suggest. Under the provisions of this act all the plumbing and drainage of new buildings must be done according to plans previously approved by this department, and the work must be left uncovered until approved by our inspector. So perfect is the system that no water can be obtained in the house until this department has notified the Board of City Works that the necessary permit can be given. There have been thus far 500 plans submitted, representing 600 houses. If we calculate nine persons to each house we represent a population of 5,400 who may rely upon having secured homes which have been watched as they were being built to see that no one through neglect or a desire for gain has jeopardized their lives or the lives of their children.

Dr. Raymond recommends the continuation of the Knickerbocker avenue and Third avenue sewers to tide water, and the acquirement of a hospital for the treatment of such cases as require isolation, which have now to be sent to Flatbush.

It is a good augury for the future that in an experience of ten years in public work there never has been a period when the relations of the various departments have been so harmonious, all working together for the public good, and without any jar or clashing. The Board of Estimate has raised money adequate to the needs of the Health Service, and a definite plan of work can be laid out for the coming year with the assurance that it can be carried into execution.

WHERE THE SEWER GAS CAME FROM.

The dread of sewer gas is one of Boston's monomanias. Of course too great care to exclude it cannot be taken. Mrs. Jones lives in mortal horror of even the slightest unpleasant odor. Having cultivated her sense of smell to the highest possible point, she can detect an odor reduced to a thousandth potency. When she alighted from her carriage and entered her palatial residence a few days since she exclaimed: "Sewer gas!" The household was in a state of turbulency at once. The plumber was sent for. He detected something—but he did not think it was sewer gas. "Don't tell me," said Mrs. Jones, and sent for the family physician. He thought that it possibly might be sewer gas. Mr. Jones pooh-poohed the whole thing, for hadn't he paid $200 to have his plumbing overhauled? It was not a merry Christmas in that house. One of the girls was taken ill—and this was a clincher. The family physician pronounced it indigestion, but Mrs. Jones knew better. In another week the family would have moved into the nearest hotel had it not been that Mr. Jones, while inspecting the back yard, discovered that the man who put manure around the grape vines, instead of carrying off the surplus, had banked up the inlet of the cold air box to the furnace.—*Boston Journal.*

Four children recently died within three days of scarlet fever in a Brooklyn residence which is said to have been supplied with all the latest improvements in sanitary plumbing. The Health Commissioner will cause an examination to be made, but does not anticipate finding any defects.

After one teacher has died, another gone into consumption and a third on the way thither, it has been decided that the dampness of the Elm street school building basement is too great to warrant the continuance of a school therein.—*Waterbury American.*

FATAL RANGE EXPLOSION.

A fatal explosion took place yesterday at the residence of Mr. H. S. G. Archer, No. 146 Mansfield street, by which a young girl, 19 years of age, named Louise Hamlin, was instantly killed. The accident occurred about eight A. M., and is thus explained. The stove had been cold since early the day before, and during the night the water had frozen in the pipes, and the sudden heat, on the fire being lighted, caused the explosion. The kitchen stove was completely overturned, and the unfortunate girl, who was employed as a servant, was struck by two large pieces of iron, one on the side and the other on the forehead, the latter badly fracturing the skull.—*Montreal Star, Jan. 2.*

This is the second fatal accident from exploding ranges which has come to our notice within a week. If people will take the simple precautions we have time and again called attention to such casualties will not be reported.

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MALARIA.

BY GEORGE M. STERNBERG, M.D., SURGEON U. S. A.,
Late Member of the Havana "Yellow Fever Commission" of the National Board of Health, Cor. Member of the Epidemiological Society, London; F. R. M. S., etc.

WHAT IS MALARIA?

Evidently malaria means bad air; but there are many kinds of bad air. Is this then a general term used to indicate that the atmosphere is contaminated with something not found in pure air, and that, consequently, it is bad?

If so, the sulphurous vapors from the "lead factory"—reduction works—in view from my front window, which impregnate the atmosphere and cause me to cough, when the wind is from the south, are malarial; and the horrid stench from the bone-boiling establishment, which I must pass in going to the "Presidio," is malaria of a very offensive and disgusting kind. But my health does not suffer from the occasional doses which I take of this bad air, and the workmen at these establishments, who respire it habitually, seem to be lusty fellows. As it is generally understood that "malaria" is something which undermines the health and calls for a prescription from the family doctor, it is apparent that bad air which does no harm must be excluded from the definitions when we are prepared to give it, and that the disagreeable varieties of bad air referred to, come under the general head of "nuisances" and not under that of malaria. But what shall we say of our gentlemen patients who stick out their furred tongues at us with a grimace and a shake of the head, saying, "I don't know what's the matter with me, doctor, but I feel dull, have a slight headache, and no appetite worth speaking of (especially in the morning), for breakfast; I expect it's malaria?"

If we wish to be in fashion, and not to offend our patient, we may confirm his diagnosis and give him a dose of "quinine." But if we don't mind being disagreeable and can afford to take the chance of losing a patient, we may inquire how many cigars he smokes every day, how many glasses of champagne, lager beer, or whatever may be his favorite tipple, he drank the previous evening, etc., before we commit ourselves to a diagnosis.

So too when a lady patient complains of "malaria" there are certain questions as to the temperature of her sitting-room, the amount of exercise she takes, etc., which the conscientious physician thinks it necessary to ask, before deciding that her aches and pains are malarial.

If the fashionable "malaria" is not always due to bad air, surely it is vitiated air in illy ventilated school houses, churches, etc., which gives rise to the uncomfortable feelings which are experienced by one who is compelled temporarily to respire the atmosphere of such a place, crowded with human furnaces, each giving off the products of combustion into the confined space; and to the languor, loss of appetite, headache, etc., complained of by the unfortunate victims who are required to respire such an atmosphere for several hours daily.

Yes, this is bad air, poisoned air, and noxious enough to be called by a Latin name; but it is not *malaria* under the restricted signification which by common consent is given to the word in order to designate a special kind of bad air.

The kind of bad air which is given off, most abundantly from marshy grounds, and *which is the cause of that* class *of fevers known* as "*paludal*" (*palus*, a marsh) or "*malarial;*" *the most important distinguishing characteristic of which* is *their paroxysmal character* intermittent, or remittent. But having made this definite statement let us hasten to say that malaria may be given off from ground which is not marshy; that not all marshy ground produces malaria; and that malarial fevers are not always paroxysmal.

The critical reader may pause here to remark that after considerable beating about the bush we have a definition of malaria—in italics—which tells us in a general way whence it comes and what are its effects; but that the question, *What is malaria?* don't seem to be answered. The justice of this remark is admitted and at last we are forced to the definite answer—*We don't know.*

While it is always humiliating to confess ignorance, it is, nevertheless, the first step to take if we really wish to be enlightened. For the assumption of knowledge which we do not possess, or the method, not entirely obsolete, of stating our want of knowledge in high-sounding words arranged in the form of a definition, cannot fail to check investigation, and, indeed, has always been a most patent barrier to scientific progress.

There are those, however, who claim to know exactly what malaria is; and to justify our confession of ignorance it will be necessary to show that these claims are not well founded, or, at least, that the evidence presented in their support is not sufficient to entitle any one of them to acceptance as a satisfactory and final answer to the question, What is malaria? These claims as to a precise knowledge of the nature of malaria, will be discussed in a subsequent paper.

The remainder of the present article will be devoted to a summary statement of known facts relating to the origin, distribution and effects of the malarial poison.

And first it may be stated that the poison is known only by its effects upon man and the lower animals (?).

"Common intermittent fever, usually of the tertian type, has been observed in horses, cows, dogs and hogs" (Hertz, in Ziemssen's Cyclopædia of the Practice of Medicine, Vol. II, p. 587.

These effects vary in intensity from slight indications of ill-health, such as lassitude, digestive derangements, headache, neuralgic pains, etc., through the various types of intermittent and remittent fever, up to the malignant and often fatal forms of poisoning known as "pernicious" fevers.

Physicians are also generally agreed that other diseases due to a distinct—specific—cause may be complicated by malarial poisoning, which influences materially the progress of the malady, or even, as some claim, gives rise to a hybrid disease, *e g.*, the so-called typho-malarial fever.

Malarial fever, *per se*, is rarely a fatal disease in the northern portions of the United States; but the malarial poison is nevertheless responsible for a very considerable proportion of the mortality which occurs in the extended areas over which it is evolved in greater or less amount.

For continued exposure to its action undermines the general health and renders the subjects of this kind of poisoning less able to resist the effects of more potent poisons, such as that of typhoid, yellow fever, diphtheria, etc.

As we go further south the mortality tables furnish us evidence of increased potency, and in certain localities in the tropics the malignancy of this poison, as shown by the rapidity with which it kills, is not second to any of those mentioned.

Here, then, is one factor—*heat*—in the production of malaria the influence of which cannot be questioned.

Two other factors are also necessary, viz.: moisture and the presence of organic material of vegetable origin. It is easy to demonstrate that all of these factors are essential, and that no two alone can produce malaria. Thus we have heat and moisture, but no malaria, at sea in the tropics. We leave bales of hay or sacks of grain exposed to the rays of a tropical sun for any length of time without producing malaria so long as they remain dry. And in extreme northern latitudes organic material of vegetable origin may be saturated with moisture for months without any malaria being produced. But in tropical swamps we have all of these factors combined and here we have evidence of the presence of malaria in its most potent form. Of course, in speaking of *heat* as a factor, we refer to a definite range of temperature, within which, the other conditions being present, malaria may be produced.

Now, the conditions under which malaria is evolved, are exactly the conditions favorable for the decomposition of organic material, and, as a matter of fact, malarial emanations may usually be traced to localities where *vegetable* material is undergoing decomposition.

This is not necessarily in swamps only; but, as well, in damp bottom-lands, in imperfectly drained uplands, and in general, wherever vegetable material is exposed to decomposition under the influence of warmth, moisture and *air*. For here is an additional factor. Vegetable matter, even if moist and exposed to the proper temperature, does not decompose rapidly unless liberally supplied with oxygen. For this reason it may accumulate at the bottom of ponds, or in the soil, where this is not disturbed and there is a luxuriant vegetation. If, now, the bottom of the pond is exposed, or the soil is turned up by the operations of the engineer or the agriculturalist, decomposition proceeds rapidly, if the temperature be favorable and there is sufficient moisture, and under these circumstances malaria *usually* manifests its presence in a very decided manner.

On the other hand extended experience proves that, as a general rule, the effects of malaria are less manifest exactly in proportion as marshes and low damp soils are drained and cultivated, or permanently flooded with water.

There can be no doubt with reference to the influence of the factors named in the production of malaria. But we have been obliged to qualify the general proposition that these factors produce malaria, by the word *usually*. For there is good authority for the statement that these factors do not always give rise to malarial emanations. Thus Hertz says, "Malaria may be found in the mainland of Australia, though in a mild form. It assumes a severe type on some of the smaller islands, as the New Hebrides and the Society Islands, and, strangely enough, *is entirely unknown on the Sandwich Islands and the Samoan Islands as well as the island of New Zealand and Van Diemen's land, in spite of their marshy ground and frequent inundations.* (*l. c.*, p. 563.)

How shall we account for these remarkable exceptions to the general rule? First, we might inquire as to the truth of the statement. For statements of this kind, published in encyclopædias, cannot always be accepted without question. But accepting this, let us see how much weight should be given it, and whether the facts can be reconciled with those already given.

First, we note that New Zealand and Van Diemen's Land, where malarial fevers do not prevail, are between 35° and 50° south latitude, while the New Hebrides and Society Islands are twenty degrees nearer the equator. The facts, therefore, conform with what has been observed in the northern hemisphere, as the greater part of New Zealand and all of Van Diemen's Land, is beyond the latitude where malarial fevers are most prevalent. This is not true, however, of the Samoan and of the Sandwich Islands. These islands are all of volcanic origin and the largest active volcano in the world—Manna Loa—is upon one of the Sandwich Islands. Possibly this has something to do with the exemption which these islands are said to enjoy from malaria. This view is sustained by facts recently brought to the notice of the French Academy of Sciences in a communication by M. d'Abbadie (*Comptes Rendus, t* XCV., p. 497-500.)

This author having learned that certain elephant hunters in intensely malarious regions in Africa, enjoyed an immunity from the effects of the poison which they attributed to daily fumigations of the naked body with sulphur, undertook an investigation for the purpose of ascertaining whether "sulphurous emanations received involuntarily in places where malaria prevails, preserve the health of the inhabitants." The evidence collected is decidedly in favor of the view that such is the case.

The general statement that malaria is most abundantly generated in marshes—fresh or salt water—and in low, damp grounds, is not invalidated by the fact that it may also prevail in mountainous regions and in places where the soil is superficially dry. A loose surface soil, overlying an impervious stratum of clay or rock, permits the air to penetrate to this stratum, where the water which accumulates after a rain may be retained in depressions, and we have thus all the conditions necessary for decomposition of the vegetable matter which may be present in the soil, and for the evolution of malaria.

[TO BE CONTINUED.]

HEATING AND VENTILATION OF THE BRIDGEPORT HIGH SCHOOL HOUSE.

The heating and ventilating of the new school building at Bridgeport, Conn., have previously been described and discussed in THE SANITARY ENGINEER, particularly in the issues of July 1, 1880 (Vol. III., page 294) and Dec. 1, 1881 (Vol. V., page 4). Since the occupation of the building in October last, it has been visited and examined by several prominent heating and ventilating engineers and others who desired to observe the practical operation of the plan.

One of the most extensive of these examinations was made by Dr. D. F. Lincoln, of Boston, on the 22d and 23d of December. From the notes of our representative, who was present in the afternoon of the first day, we give a report of the thermometrical and other observations then made, to which is added a report of the observations on the following morning from notes furnished us by Dr. Lincoln himself.

The room selected for examination was that in the northwest corner, on the third floor, which was unoccupied, except by eight or ten gentlemen present to assist in

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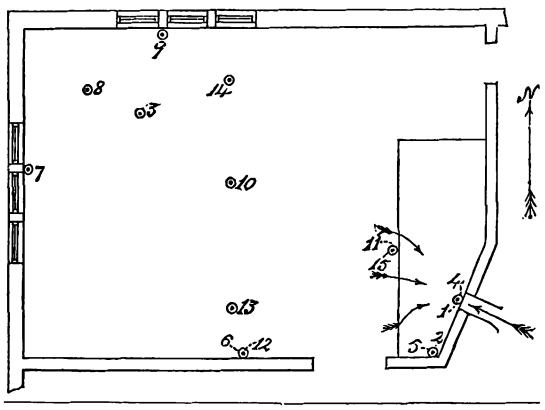
or witness the observations. The school rooms, it will be remembered, are all of the same size, 26 ft. x 38 ft. (or a little larger in the upper stories as the thickness of the exterior walls decreases) and 13 ft. high, giving about 13,000 cubic ft. of air space, and heated in the same way. Briefly, the peculiar feature of the system is the introduction of fresh air at the inner corner of the room, opposite the outside walls, instead of at the outside walls as is customary, and the removal of the foul air at the same corner, directly under the inlet. The latter is about eight feet above the floor and measures 20 inches by 28 inches, or, deducting one-third for the scroll grating of the register, having an area of about two and one-half square feet. The outlet is beneath the teacher's platform (which is raised several inches above the floor on castors to allow its easy removal for cleaning under it) and is five feet in area, unobstructed by a register. The outlet opens directly into a large central brick exhaust shaft in which is carried, in metal flues, the fresh air to each room from heating coils at the base of the shaft, the loss of heat from the inlet ducts being thus utilized to create a draft in the



exhaust shaft. When artificial heat is not required and fresh air is introduced through the windows, the inlet register may be used as an outlet by closing a valve below it and opening another into the exhaust shaft. While hot air is being admitted the room is closed, special pains having been taken to make the windows tight by carefully fitted casings with the addition of weather- strips. There are six windows in each room, as shown in the accompanying plan—three, close together, in the rear and as many on one side—the scholar's left hand. The glass surface of each measures eight feet by three feet, two inches, the bottom being four feet above the floor. The outer walls are of solid brick of unusual thickness and the interior surfaces have a fine "sand finish."

The large opening, shown in the plan, at the left of the platform is into the assembly room through folding doors and the smaller one on the right into the hall. The circles on the plan indicate the position of thermometers and the numbers beside them are those used in the table below. Where two numbers are attached to one circle, there were two thermometers, one above the other. No. 1 was at the centre of the hot air register—about eight feet above the floor; Nos. 2 and 3 at a height of 12 feet above the floor (about as high as the instrument could be placed in a vertical position); Nos. 4, 5, 6, 7, 8, 9, 10 and 11 at a height of five feet, six inches—level of bulb; and Nos. 12, 13, 14 and 15 at one inch above the floor, No. 15 being in front of the outlet.

Number of Thermometer on Plan.	December 22, P. M.					Dec. 23, A. M.		
	2 h. 40 m.	2 h. 50 m.	3 h. 10 m.	3 h. 25 m.	4 h. 0 m.	9 h. 0 m.	9 h. 40 m.	10 h. 7 m.
1	108° F	112°	120°	120°	119°	90°	104°	135°
2	74	76	80	81+	84	.....	70	80
3	75	78	84	85	87	.....	67	79
4	69	70	73	75	76	61	63	68–
5	69	71	74	76	77	61	63	69–
6	69	71	74	75	77	60	62	69
7	71	73	76	78	79	60	63	72
8	68	70	73	75	.....	.....	.....	.....
9	70	72	76	77	78	60	62	71
10	69	71	75	76	78	60	63	69
11	70	72	76	77	79	61	63	70
12	67	67	.....	70	.....	.....	.....	.....
13	66	67	70	.....	.....	.....	60	62
14	65	65	.....	69	69+	57	59	60
15	68	69	71	73	.....	.....	61	64
Outside	.....	37	.....	36	.....	41	.....	.....

The thermometers used were said to have been carefully selected and compared with each other and to have had no great variation. The room had been closed (before the afternoon observation) at 12.40. A class of about fifty scholars—the full number—was admitted at three o'clock and dismissed twenty-five minutes later.

Two measurements were made of the amount of air coming in. The first at about 2.50 showed nearly 800 cubic feet per minute and the second at 3.15 nearly 1,000 cubic feet per minute, or 20 cubic feet per pupil.

In the words of Dr. Lincoln, "abundant proof was given that the current passes very rapidly across the ceiling, quickly down the exposed (outer) walls, then slowly back across the room to the outlet; the range of temperature, regularly falling in about this order, furnishes a proof of this, and further evidence was fu'ly given by the action of anemometers at ceiling and at the outer, exposed faces of the room. *In the latter situation, the current was invariably downward*, and the elevated temperature at the windows will be noticed.

"To answer a question as to the temperature at the level of the pupils' bodies, a thermometer was placed upon a desk at 14. In the last two trials (right-hand columns) the readings of Nos. 3, 9, the new thermometer and 14, (respectively placed at the ceiling, at 5½ feet from floor, at the desk level, and at the floor) were 67°, 62°, 60°, 59°; and 79°, 71°, 63°, and 60°."

Correspondence.

THE VENTILATION OF ELEVATED RAILWAY CARS.

To the Editor of THE SANITARY ENGINEER:

Your sterling method of treating sham sanitation, and exposing the absence of needed sanitary appliances, where the public are interested and have a right to demand them, leads me to call your attention to the imperfect ventilation of the cars on the Sixth Avenue Elevated Rail Road.

A short time since the atmosphere of the car in which I rode being more than ordinarily foul, I inquired of the conductor the reason, and was informed that during cold weather the cars were never aired while in use.

If the conductor's statement was accurate, are not the railroad authorities culpable for this neglect of duty toward the public? HARLEM.

[We have ourselves experienced the discomfort to which our correspondent refers; but we can hardly credit the statement of the conductor. Certainly, opening the windows and doors of every car for two minutes at each terminus of the line would completely change the atmosphere of the car, and would go far toward remedying the evil complained of.

We believe, however, that the railroad company owes it to the public, for whose convenience, primarily, it exists, and upon whose patronage it depends, that the most approved system of ventilation should be adopted and applied to their cars.]

REMOVING SNOW FROM SIDEWALKS.

BOSTON, *Dec.* 26, 1882.

To the Editor of THE SANITARY ENGINEER:

I noticed in a yard recently, at a time when the ground was covered with snow, a long strip of bare ground, and, on examination, discovered that underneath it was a steam pipe running between two buildings. The idea came to me that a coil of pipe placed under a sidewalk and connected with the boiler of the adjacent building, might prevent the formation of ice thereon, in winter, and so save the trouble of removing snow and ice, and often prevent serious accidents. Of course, the coil need be connected only during storms and cold weather.

[In practice it would be found much cheaper to pay a person to thoroughly remove the snow than to maintain an apparatus such as you propose and pay for the coal required to do the duty in this connection. We refer you to an article on page 231, Vol. IV., which will give some idea of the cost of removing snow by the use of steam.]

APARTMENT HOUSE BOILERS.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR:—Will you please explain how the expansion pipes and supply tanks are arranged for the boilers in your high apartment houses? As I understand the street pressure does not rise above the second floor, and some of the new buildings are said to be ten stories, how are the boilers in the upper floors arranged? Particularly I want to know whether there is one tank in the top of the house for all the boilers, or whether there is a separate tank, or tanks on each floor for the boilers on that floor. If a single tank on top is ever used, I want to know whether lead pipe is strong enough to withstand the great pressure at the lower boilers, or what metal is generally used for the pipes, both supply and expansion pipes; also how the expansion of so long lines of pipe is allowed for. You would oblige if you would illustrate these points from some of your large jobs.

[In the high apartment houses referred to the hot water is supplied to the different floors from a hot water tank in the basement; this is fed by cold water from a tank on the top floor or roof of the building. The water is heated by a steam coil and complete circulation is maintained. The pipe generally used in this city is wrought iron galvanized. We shall describe and illustrate this feature in an early issue.]

JOINTS ON SOIL PIPES.

BOSTON, *Dec.* 20, 1882.

To the Editor of THE SANITARY ENGINEER:

I find great difficulty in getting caulked joints of cast iron soil pipe to stand the test of atmospheric pressure. Many joints, as they are usually made by the plumber, will stand the pressure of a considerable head of water, but air under pressure passes through. Would you kindly inform me if a flange joint secured by bolts, and having a packing of paper or leather covered on both sides with red lead or other good cement, or putty, would not make a *tighter*, stronger and surer joint for soil pipe connections within houses?

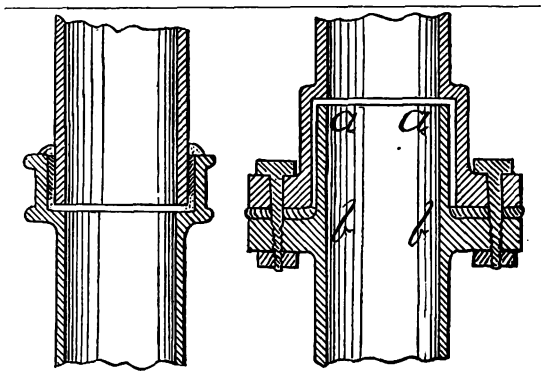


Fig. 1 *Fig. 2*

As for the question of the economy of such flange joints, both as to space and cost, what relation should you judge them to hold with the ordinary caulked joints? The extension *a b*, *a'*, *b''*, in the flanged joint, Fig. 2, might be omitted. Would such an omission in practice be likely to occasion misfits? Very truly yours,

SUBSCRIBER.

[The joint you propose might stand a greater test than the average lead caulked joint, but in many situations it would be impracticable to make it. There is no difficulty, in our judgment, in securing lead caulked joints that would be tight against any possible entrance of drain air. Under what circumstances an atmospheric pressure, such as you refer to, could exist in any ventilated system of drain pipes, we are unable to conceive.

The joints you propose would cost at least double in labor. The iron founders would have to make an entire line of new patterns; each flange would require to have its face filed off true and smooth; any attempt to screw up the bolts when the slightest variations occurred would result in splitting the flange. If your plan were adopted at all, it should have the projections *a a* as you suggest, but we can see no valid reason why the expense should be incurred to carry out this suggestion.

It is quite true that lead caulked joints are frequently not tight, but this is due to careless and inefficient work—the pouring in of the lead too cold and the lightness of the ordinary iron pipe. It is feasible and possible to caulk joints on the ordinary pipe for a three-story house so that they will stand the ordinary water tests, but for higher buildings and longer runs it is hardly possible to do this without splitting the hubs. If we were writing a plumbing specification we should always call for the extra heavy pipe; with this joints can be caulked to stand any pressure they would ever be subjected to, and the difference in price is money well invested. With what is now known as the "extra heavy pipe," there is no excuse whatever for leaky joints. And if it was understood that each piece of work had to stand a test, the work would be properly done.

On this question we would like to present the opinions of our plumbing readers.]

A PLUMBING SPECIFICATION.

HARTFORD, CONN., *Jan.* 2, 1883.

To the Editor of THE SANITARY ENGINEER:

Inclosed is a specification of plumbing and gas-fitting for an office and residence of an eminent physician.

The water supply is not constant; the sewer is about 200 feet away from the house.

The inlet is designed to be surrounded by shrubbery for concealment, and the absorption of any gases that may escape.

The two soil pipes are carried up in vent-flues of chimneys; would it be safe to carry them in smoke flues?

The house measures about 60x70 feet, and is entirely isolated, and surrounded by trees. The rain-water leaders are discharged into rock pits, and thence into the light sandy soil.

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All the work is constantly under the eye of a competent superintendent. The gas-fitting notes are taken from Prof. Clarke's specification in the *American Architect.*

Will you please criticise. Q. V.

PLUMBING.

Fixtures in Basement.—Water closet. Supply to wash boiler. Set of three wash-trays. Sill cock.

First story.—Kitchen sink. Pantry sink. Bath boiler. Water closet. Two wash bowls.

Second story.—Two bath tubs, two water closets, six wash bowls. Slop sink.

Attic.—Tank.

The two soil pipes to be heavy wrought iron, 4", lead, calked joints, tarred inside and out. They are to be carried on an even pitch in basement, and the east pipe will be suspended from ceiling until pitch interferes with head room, when it is to be carried to trench and carefully aligned on a red cedar board, the ground having been previously well rammed and puddled. A 4 x 4 x 6 Y-branch will connect the two pipes, and the heavy 6" tarred iron soil pipe will be carried outside of foundation walls, where it will be tightly connected with earthenware drain.

Inlet.—Sixteen feet beyond rear of house place a 6" glazed earthenware (Akron) trap in a tight square well, 2' 0" x 3'0" with cemented walls and concreted bottom. Insert a tarred 6" iron inlet pipe into a quarter bend on house side of traps and secure with oakum and cement. Cast iron ventilating cap.

The mason builds the well, concretes it, and covers with flag-stone, and lays the drain (6" glazed Akron) from trap to sewer in Ninth street. The plumber is to furnish, set, and be responsible for all the rest.

The soil pipes are to be carried 6" above top of chimneys with end glazed.

Water closets.—In basement, a flush rim crockery hopper. Henderson's flushing valve, operated by seat. Tank 1' 0" x 1' 0" x 2' 0". Ball cock and overflow. Lined with 14 oz. tinned copper.

Coat room and dressing room water closet, Hellyer's short, flush rim hopper and trap with tank complete, operated by seat. Preliminary flush.

For each seat furnish one Italian marble dished slab, with back and side strips 4" high. Front edge ogee moulded.

Strip of copper dressed around top of bowl to make tight against marble seat, with vent connected with 2" ventilating pipe from trap.

The seat of bath room water closet will be of wood, but the water closet will be the same as other two.

Wash bowls.—Best marble 15", all supplied with hot and cold water. 1½" 3-lb. lead waste with trap, and 1½" vent pipe therefrom carried separately to a point above other fixtures where all vent pipes are connected with soil pipe. The three bowls remote from soil pipes are ventilated at centre of cornice with glazed ends.

The brass soldering ferrules for all connections of lead into iron wastes, 1¼" dished slate white Italian marble 12" back and side strips where needed; free edges ogee moulded.

Bath tubs.—16 oz. planished and tinned copper; 2" lead pipe waste and S-trap 1½" vent. Tube 5' 6" long.

Slop sink.—Mott's 22" x 20" x 12" round corners, enamelled iron, with overflow.

Pantry sink.—Tinned copper oval; 16 oz. drainer of corrugated copper not tinned. Entire shelf coppered with 14 oz., turned up 3" all around. 6" round trap of 6 lb. lead.

Kitchen sinks.—24 x 48 wood, lined with 20 oz. copper, with brass strainer and soap holder. 6" round trap. 6 lb. lead; air chamber to pipes over sink.

Wash trays.—Three of Monahan Ceramic Co.'s, one with rubbing board, plugs, chain, soap-holder, etc., complete, one 6" round lead trap for the three trays.

Clothes boiler.—Furnish and set 25 gal. 22 oz. tinned copper with steam pipe connecting with flue.

Tank.—Line with 16 oz. tinned copper, size 2' 0" x 3' 0" x 4' 0".

Provide with ball-cock and ball-overflow; bath boiler valve and self closing ⅝" cock for drawing water in attic, all heavily soldered and finished in the best manner.

Bath boiler. Eighty gallon, warranted copper; iron stand; 1" brass pipe to water back; sediment cock; ¾" —2¾ lb. circulating and expansion pipes.

All overflows are to be carried below water line of trap.

All fixtures are to be ventilated with galvanized iron pipes extending to outside air away from windows or into soil pipe above highest waste pipe.

Wash basins, baths, kitchen and pantry sinks, 1½" vents, remainder 2".

All cocks (compression on wash bowls), chains, plugs, etc., to be nickel-plated heavily.

All bowls, baths, sinks and wash trays connected with hot and cold water.

Supply.—Run a 1¼" enamelled iron pipe from cellar wall direct to tank in attic. Take off 1", 3 lb. lead branch to range, kitchen and pantry sinks. Supply all other fixtures direct from tank in attic by 2½ lb. lead ¾" pipes, ¾" cocks to bath tubs, slop sink and wash trays. ⅝" cocks to kitchen and pantry sinks and wash boiler. ½" cocks to wash bowls; provide strainers, plugs and chains to these and bath.

All lead pipes between floors to be laid on boards, with proper and even inclination to drain off water; thoroughly put up with tacks.

All joints wiped except wastes under basins.

Furnish and do all as intended by plans and specifications, and as directed by the architect to complete the whole, a first class job in every respect.

Add.—All piping where possible to be visible except in main halls, parlor, sitting room, main office, dining room and second story chambers.

(Apply peppermint test and leave all perfect.)

[The placing of soil pipes in vent flues or smoke flues is decidedly objectionable, for the reason that they will be inaccessible.

The discharge of rain water into rock pits and thence into soil is also objectionable if near the house.

The terminus of soil pipe should not be near the top of a chimney; at certain times there is likely to be a down draft.

The provision "all fixtures are to be ventilated with galvanized iron pipes extending to outside air, away from windows or into soil pipe above highest waste pipe" is dangerous, for as we understand from a sketch accompanying the specification this ventilation is intended for the space surrounding these fixtures. If we are correct in this assumption the effect of connecting the pipe to the soil pipe would be to provide means for bringing the soil pipe air into every apartment in which a fixture so connected is placed. Such pipes should always be run into a heated flue or carried to out of doors with a gas jet in them to induce a draft. Vents from traps are the only ones that should be branched into a soil pipe as here called for.

Finally as a specification this is quite incomplete, since it only states what kind of fittings are wanted, and does not describe in detail the character of the work. It might do if the work is to be given to a first-class plumber without competition, but if let out to several parties to estimate on it will be difficult to secure under it a strictly first-class job, if the cheapest man gets it.

We suggest that the form of specification furnished by the New York Board of Health be used and filled out as required.

We have omitted the specification for gas fitting.]

THE PEPPERMINT TEST.

WILMINGTON, DEL., *Jan.* 2, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you please be good enough to inform us how what is known as the "Peppermint Test," is applied to pipes in testing for leaks? We often see it referred to in THE SANITARY ENGINEER, but have never seen any description as to how it was done. Has it ever been described in THE SANITARY ENGINEER? We will be obliged if you will give us the information. Yours respectfully, A. S.

[It has frequently been described in THE SANITARY ENGINEER. It consists in having a person pour the contents of a two ounce vial of oil of peppermint down the soil or waste pipe from the highest fixture, (or open end of the pipe above the roof), following it with two or three gallons of water so as to convey the peppermint the entire length of the drain. Another person examines the drain pipe or soil pipe, from the cellar wall up through the house. If there is an opening anywhere the smell of peppermint will be plainly perceptible.

In making this test great care must be taken that the person handling the peppermint spills none of it about the room or on his person; otherwise the smell will pervade the house even though the pipes are perfectly sound. For this reason practical sanitary engineers recommend that the peppermint be poured into the open end of the pipe above the roof, and the person pouring it stay on the roof until the test is completed.]

A correspondent of *Cotton, Wool and Iron* relates the results of tests made by him on several coverings for boilers. Three kinds were used; first one is covered with fine ashes made level and then a course of bricks on top; the second one is asbestos; the others are covered with sour flour, plaster of paris and fine ashes, mixed the same as mortar. Tested by a thermometer the results were as follows: Each boiler was subjected for 30 minutes to 70-lb. steam pressure. Fine ashes and brick, temperature, 114°; asbestos, 126°; sour flour mixture, 123°. One more test was made as follows: Steam pressure, 84 lbs. No. 1, ashes and bricks, 107°; No. 2, asbestos, 112°; No. 3 boiler, sour flour mixture, 110°.

PLUMBING VIOLATIONS.

Eight violations of the plumbing law were reported last week to the Health department of this city by Inspector Hooper and two by Inspector Golden. Most of them are not of a serious character.

A FICTITIOUS ENDORSEMENT.

PHILADELPHIA, *Jan.* 3, 1883.

To the Editor of THE SANITARY ENGINEER:

Enclosed you will find drawing which I cut out of paper published in our city, and would like to have you answer through your valuable paper whether you do or do not endorse such ventilation as he claims; it will surely freeze the trap and pan, and if the closet gets stopped, the soil will run down the side of the house. You will also see he was presuming enough to send a communication to our City Council. Yours respectfully,

W. E. LINDSLEY.

The inclosures are as follows:—

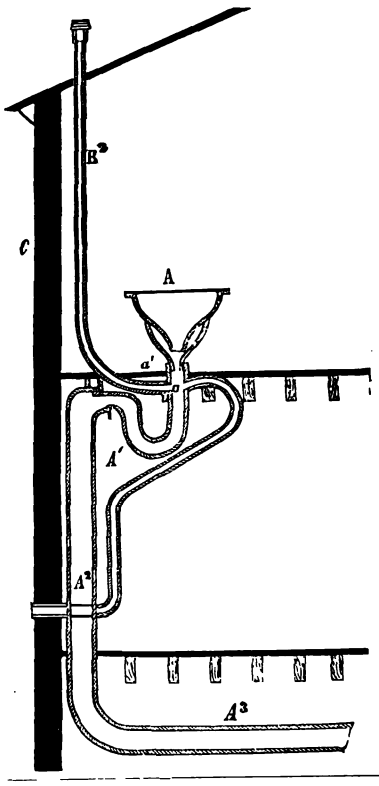
"A sub-committee of the Councils' committee on surveys yesterday met to consider a communication addressed to Councils by L. O. Howell, a sanitary plumber, advocating the passage of a general ordinance to compel the proper construction and ventilation of sewer connections. Mr. Howell was present and explained some of the dangers and defects of the present system, illustrating his remarks by plans and drawings, showing properly and improperly constructed systems of house drainage."

L. O. HOWELL, JR.,

PRACTICAL SANITARY PLUMBER.

2013 COLUMBIA AVE.

No more Typhoid or Malarial Fevers by using my System of Ventilation.



The above cut represents my Patent System of Ventilation, which has been indorsed and recommended by THE SANITARY ENGINEER.

[We have never seen this patent, do not know what its claims are, neither have we in any way whatever either recommended or endorsed it. Mr. Howell's use of our name in this way in an advertisement is an imposition, and entirely unwarrantable.

If this sketch indicates his idea of the proper way of ventilating soil pipes, he is astray. To have a water closet as the termination of a soil pipe is about 10 years behind the times, and is no longer tolerated where any plumbing regulations are enforced. There is no objection to the pipe *B* to ventilate the receiver, but that can hardly be patented, since it has frequently been done heretofore. It is cheaper and better to abandon a pan closet than to incur the expense of this vent pipe for the sole purpose of removing the foul smells from its nasty container.

The attempt to induce the Councils of Philadelphia to pass an ordinance to control plumbing work is commendable, and we noticed the movement with favor some weeks since, but we never endorsed any patented system, or imagined that any was considered. In fact, the rules of the New York Board of Health are good enough for Philadelphia, with some slight modifications in the details to suit local conditions, and there are no patents to bother about either.

Our correspondent has our thanks for calling our attention to this matter, and Mr. Howell is requested to at once withdraw our name from his advertisements.]

Three men who sold a beef carcass, which was unfit for food, to a Rochester hotel, were recently sentenced to a fine of $50 each or 30 days' confinement in the penitentiary.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

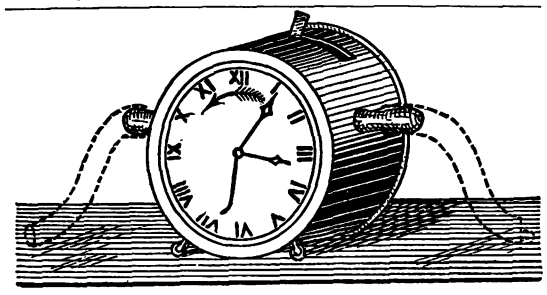
Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Jan. 6.....	23.29	18.19	21.42	24.28	28.91	18.16

E. G. LOVE, Ph.D., *Gas Examiner.*

AUTOMATIC CUT-OFF FOR GAS.

The apparatus here illustrated has been devised by H. Michaelis, and thoroughly tested in the Pharmacological Institute of the University of Berlin. It cuts off the supply of gas at any previously-determined time within the next twelve hours, and therefore puts out all lights connected with it.

The apparatus looks like an ordinary clock, which may either be placed upon the table or suspended from the wall. By means of rubber tubing it is connected with the



gas conduit; the clock is wound up, and the special alarm hand, which is situated upon the face, set upon the exact hour and minute at which the supply of gas is to be stopped. When the proper moment is reached, the turning of the alarm wheel shuts off a stop-cock situated in the gas pipe passing through the clock. At the upper part of the case, there is a slit from which projects a lever connected with the stop-cock, by means of which the latter can be turned on and regulated, independently of the clock work.

Although the apparatus is primarily intended for ordinary coal gas, still it may be used also for other gases, as long as they do not attack brass. It may also be used for the automatic stoppage of gas motors or gas engines.

The apparatus may be obtained from F. L. Loebner, manufacturer of clocks, Berlin, Potsdamer Strasse.—*New Remedies.*

The *American Gas Light Journal* contains a paper read before the society of Gas Lighting by Mr. A. M. Smith, in which are embodied the results of some tests made with the Siemens burner. Three burners were tested, and it should be stated that they are especially adapted to the use of high candle-power gas. A 500 candle burner with a consumption of 51 feet per hour, gave the lights of 505.8 candles, or 9.91 candles per foot. This was the highest result obtained. A 200 candle burner consuming 27 feet per hour, gave the light of 208.5 candles, or 7.72 candles per foot. The best results obtained with an 80 candle burner, was 86.34 candles with 14.28 feet consumption, or 6.04 candles per foot.

Dr. Foerster, Director of the Imperial Standard commission of Germany, criticises the rules for testing petroleum as given in the English Petroleum act of 1879, in that no account is taken of atmospheric pressure. He mentions two cases in which the oils tested in London with the barometer at 29.80 inches gave flashing points of 89° and 74° F. respectively. These same oils when tested at Buxton with the barometer at 28.35 inches gave 86° and 72° F. The influence of atmosphereric pressure upon the flashing point of oils cannot be considered as settled until more exhaustive experiments have been made. Different observers would get different results, even at the same pressure, and while there are so many sources of error in the testing of petroleum, it seems like an unnecessary refinement to correct for the varying pressure of the atmosphere.

ELECTRIC LIGHT NOTES.

Articles of Association of New York and Brooklyn Electric Light Company were filed Dec. 29; capital $25,000.

The Electric Supply Company, of San Francisco, has filed articles of incorporation, capital $60,000.

A Mr. Hannahs, patentee of the elevated railroad which is now seeking a grant of right of way in the streets of Chicago, has explained to the Council that electricity will be the motive power and will also be used for lighting the cars.

The Engineers' Club, of Philadelphia, have suggested the advisability of holding an exhibition for the progress and products of modern electric engineering, under the auspices of the Club. The matter has been referred to the Board of Directors.

Savannah, Ga., has awarded a contract for lighting the streets to the Brush Electric Light and Power Company for three years at $18,000 per annum. The Company's proposition contemplated the lighting of the entire city by mast lights at different points, each pole to have two or more 2,000 candle power lamps.

We recently noted that Philadelphia obtains $15,000 per year from the tax on electric light, telegraph and telephone wires, of which there are about 10,000 miles in the city. An ordinance has recently been introduced into the Select Council reducing the fees from $15 to $5 per mile of wire per annum for electric lighting, and from $5 to $2.50 per mile per annum for telegraph and telephone purposes. It is estimated this will reduce the revenue from $15,000 to $4,000 per year.

The London *Economist* says of electric light speculation that "even the great parent companies have nearly lost their premiums. Anglo-American Brush £10 shares, which opened the year at 19 and rose to 68, are now but 12½, and all the offshoots are at heavy discounts. Thus, the Scottish Brush, £2 10*s.* paid, are quoted at ¾; the Great Western, $2 10*s.* paid, are ½; the South African Brush, £2 10*s.* paid, are 1; and so on. Perhaps the best commentary on this mania is that last week the London gas companies sold a larger measurement of gas than in any previous week on record, and that their market values have distinctly risen on the year."

The Electric and Gas Exhibition at the Crystal Palace, London, was opened Dec. 13. The electric light installations were not sufficiently complete to indicate what the exhibition will contain in this respect. Among the displays of gas apparatus were a standard lamp of 1,000 candle-power, of the Messrs. Sugg, and a series of suspended lanterns of tasteful pattern of 600 candle-power. Improved lanterns and burners of high lighting power were shown by Messrs. Bray, Messrs. Siemens, and others.

A course of study giving special attention to electrical engineering has been established at the Massachusetts Institute of Technology. It provides for the continued study of electricity instead of the pursuit of other branches of physics, practice in the laboratory of mechanical engineering and the workshops. Students will receive instruction in the physical laboratory in the various methods of electrical testing. Special instruction regarding land and submarine telegraphy, the telephone, electric lighting, and the electrical transmission of power will be given, and the study of acoustics will also be required in view of the art of telephony.

Meter-ites.

The stockholders of the New York Mutual Gas Light Company have voted to reduce the capital stock from $5,000,000 to $3,500,000.

The Duquesne Gas Company of Pittsburgh, Pa., has been chartered with the purpose of furnishing gas to the city.

There have been erected in Philadelphia during the year 300 new lamps, making 12,972 now in use. There was manufactured a total of 2,403,976,000 cubic feet of gas, which is an increase of 200,000,000 feet over previous year.

During a recent meeting of the Philadelphia Gas Trust it was stated that the leakage in 1879 amounted to 460,211,005 feet. In 1881 it had fallen to 315,377,399 feet.

The danger of closing a damper in a stove pipe of a coal stove was again emphasized in Chicago, the 26 ult., by the death of a woman from suffocation, owing to the escape of gas from the stove into the bed-room. The damper had been closed to check the draft when she retired.

The Manchester correspondent of the *Journal of Gas Lighting* says that the demand for gas for heating, cooking and power is greatly increasing. Gas stoves have never been so much sought for as this season, and there is a steadily increasing demand for gas engines. In his opinion the demand for gas for these purposes makes the effect of competition with the electric light for illumination of small importance as effecting the future consumption of gas.

An explosion of gas, almost as violent as that which occurred not long ago in Philadelphia, took place in a wine store in Boston, the 24th ult. A smell of gas was noticed in the afternoon, and in the evening when an employé went into the cellar with a light a violent explosion took place, doing much damage to the stock and fixtures. A Boston builder suggests that the leak was from a street main, which had broken owing to the settlement of the made land in which it was placed.

A singular accident, due to the use of gasoline for street lamps, occurred in Lexington, Ky., the 26th ult. A lamp lighter overturned a gasoline street lamp, the burning liquid covered himself and the horse on which he was riding with flames. The animal ran and threw his rider, who was fatally burned before the flames were smothered.

The question of cheap gas has been so actively discussed in Rio Janeiro as to produce riots in the streets, the mobs smashing the windows in premises where gas was burning. The result of the agitation will be, it is said, the advertising for tenders in the United States and in Europe.

Councilman D. S. Page, of Philadelphia, has prepared a statement showing the profit which the city can realize from the gas works. The net cost of production is put at 90.2 cents, of distribution 26.9 cents per 1,000 cubic feet. With 10 per cent. allowed for loss by leakage, the cost is $1.27 per 1,000 cubic feet. Should the city sell gas at $1.50, he estimates that a profit would be realized represented at 4 per cent., a capital of $23,911,350.

The following figures concerning the illuminating gases of this city are taken from the report of the Gas Examiner for the quarter ending December 30, 1882:

	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Average Illuminating Power for the Quarter	23.60	18.68	21.43	25.83	28.74	18.81
Sulphur, grs. in 100 cubic feet.	9.00	21.70	20.50	5.47	3.62	23.32
Ammonia, grs. in 100 cubic feet.....	0 23	6.61	1.36	trace	0 23	10.82
Specific Gravities.....	.630 to .684	.415 to .460	.532 to .568	.750 to .798	.630 to .646	.424 to .432

THE SANITARY SURVEY OF HAVRE.

In the number of this journal for April 13, 1882, p. 401, an account was given of the undertaking a systematic inquiry into the sanitary condition of the City of Havre, France, and of the creation of committees to investigate the sewerage, paving, markets, etc.

The first result of this inquiry has now appeared in the form of an octavo volume of 94 pages, entitled "Commission d' E'tude de l' assainissement du Havre." Rapport général, présenté par M. Edouard Widmer, Ingénieur des Ponts et Chausées, and the conclusions are summarized as follows:

That there should be created at once a system of sewers on the combined system, adopting the principle of "all to the sewer," provided the following conditions are secured, viz.: 1, a sufficient fall; 2, an abundant supply of water; 3, a constant flow; 4, a perfect ventilation. The small pipe system is discussed and condemned as unsuited to the topography of Havre, which must have sewers for removal of rain-fall in any event. The sewers are to be built of brick, about five feet in height, egg shaped, and to have drains above them to keep the streets dry (*i. e.*, for sub-soil drainage). New streets are to be not less than 15 metres wide, and the streets and gutters are to be kept cleaner and more frequently sprinkled. It is suggested that sea water may be used for this purpose, and also for securing flushing of the sewers by means of automatic flush tanks. In the absence of a map it is impossible to understand the recommendations made with regard to the location of the main sewer outlet. It is recommended that each householder and proprietor be required to drain his premises, that all privy vaults be ventilated, that the water supply be increased, the use of zinc-lined cisterns in houses be forbidden, a new abattoir constructed, a better system of inspection of meats and markets inaugurated, a municipal laboratory be established for the control of adulterations of food, and that vaccination be made compulsory.

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There is little reason to doubt that if the recommendations of this report be carried out, the mortality of Havre, which for the last five years has been at the high rate of 29.2 per 1,000 will be materially reduced, and we shall look with interest to the next steps taken by the authorities, who thus far deserve commendation for their energy and the methods they have adopted to obtain reliable information and expert advice with regard to the sanitary needs of the city.

SEWAGE PURIFICATION.

We have recently received an account of a trial made in the suburbs of Berlin, of a patented process for purifying sewage by a combination of filtration through peat and gravel and precipitation with milk of lime. The inventor is Dr. F. Petri, who is already known as a patentee for a method of disinfecting excremental matter collected by the pail system.

The sewage is first allowed to pass over and through a series of peat beds, by which it is freed from its suspended matter. The peat is said also to absorb the free ammonia, and to act antiseptically upon a large quantity of the decomposing substances. The sewage then flows into channels, where it is mixed with milk of lime and discharges into large settling tanks, where the lime precipitates the remaining quantities of organic matter. After being once more filtered through a layer of gravel, after leaving the basin, to free it from any impurities that may still be left, the effluent discharges into the creek. The chemical analysis shows the process to be a satisfactory one, as far as purification is concerned. But we think that its evidently great expense would bar its successful introduction in all but exceptionally situated towns.

NOTES FROM CHICAGO.

(From our Special Correspondent.)

I met Oscar C. DeWolf, Health Commissioner of the city, this morning. "Yes, I believe it is true," he said, "that I am the first of the sanitarians of the West who called attention to this danger of our people from immigration. Two years ago, and again last year, I labored with Congress, and finally the Illinois State Board took it up, and the result is this somewhat startling array of statistical proofs by Dr. Rauch, the Supervising Inspector of the North-west, in charge, for the National Board of Health, of the work of railroad inspection in the three States, Illinois, Indiana and Michigan. The whole North-West, with Chicago, is vitally concerned in Dr. Rauch's deductions, for 60 per cent. of the immigrants entering the ports of this country pass through Chicago, as the distributing point of the North-West. Even New York, as the great port of entry, is not so concerned as we, because in Castle Garden they close them up, put them on cars in loads like sheep, pass them here, and here they either stay or distribute themselves over the regions beyond. They have quarantine at the sea board; we have none—hence the vast importance of the railroad inspectors. Since the census, two years ago, 100,000 immigrants have been added to Chicago as permanent population, not to speak of the multitudes who stay here with friends on longer or shorter visits, or while the agents here are arranging to forward them on to their distant homes."

"And this, you hold," the doctor was asked, "as the explanation of Chicago small-pox?"

"I hold the fact to be demonstrated by Dr. Rauch. The health department vaccinated here 94,000 people this year. The Poles, for some reason, are dead set against vaccination, as much so as Indiana Dunkards against lightning rods, and this fact has greatly increased the contagion. If the foreign arrivals don't bring it, how do you explain that our own citizens don't suffer from small-pox? That's a settler in my humble opinion."

Electrical undertakings are also coming to the front. The Western Underground Electrical Company began operations this morning, at Wentworth avenue and the southern limits, and expect to extend their tunnels northward to the heart of the city, so as to supply the same with light by May 1. Branch lines all over the city are outlined. The Company gave up for a bad job its proposed ordinance increasing the size of its tunnels in places from two feet square to three feet wide and five feet high. By a majority of two the Council, at its last meeting, refused a franchise to the Western Edison Light Company, but its application is not withdrawn.

Building operations are very active for the season. Mr. L. P. Leiter is credited with proposing in the spring to build a first rank hotel at Michigan avenue and Congress street. The buildings constructed in the city this year cover about fourteen miles of frontage and cost over $17,000,000. In the same time 36½ miles of streets have been improved, costing $1,100,000, the city's contribution being one-quarter of the sum.

Health Commissioner De Wolf is hesitating between two plans of disposing of the garbage collected in the city, one scheme being to burn it and the other to remove it by train to the country.

Dr. Paton, city physician, is putting in spare time accumulating evidence against suspected violators of the smoke ordinance, which, as a rule, is now being commendably kept.

The Master Plumbers' Association met January 5, some thirty being present; Daniel J. Rock, the President, in the chair. Communications were received from Baltimore and Milwaukee plumbers, asking points for the establishment of plumbers' associations in those cities; also for a brief statement of the advantages arising from organization.

It was decided not to entertain any complaint against members unless it should be formally presented in writing and state specifically the facts in the case, and the complaint handed to the Secretary and by him handed to the Association.

It was announced by Mr. Young, of the Sanitary Committee, that Prof. A Reeves Jackson, of the College of Physicians and Surgeons, would deliver a lecture on sanitary interests, at Fairbank Hall, at a date to be hereafter announced.

In conclusion, the President commended the large attendance, and hoped that all fees would be promptly met, and that the interest in the meetings would continue to grow.

Reviews of Books.

STORMWATER REMOVAL IN TOWNS. With Special Reference to the Sewerage of Berlin.

This is the title of a small pamphlet written by M. Knauff, retired engineer of the Prussian Government, in consequence of the insufficient capacity of the Berlin sewers, shown during several heavy rains last summer. The rain fell at the rate of three-fourth inches in twenty-five minutes, and the capacity of the system is by law proportioned for a quantity of one-third of an inch per hour to reach the sewers.

He advocates a larger capacity for the sewers in the still unfinished districts, and recommends improvements in street-gullies, ventilating man-holes and the removal of the peculiar traps in the rain leaders from houses, (See SANITARY ENGINEER, Vol. VI., p. 444), and also advocates the use of cement for pipe-joints instead of clay and gasket, the present method, on account of the fact that the pipes run at times under pressure.

The larger part of the pamphlet is devoted to a defence of the separate system in general and for Berlin in particular. No arguments that our readers are not familiar with are advanced.

ANNUAL REPORT OF THE SUPERVISING SURGEON-GENERAL OF THE MARINE HOSPITAL SERVICE for the fiscal year 1882: 304 pp. 8 vo., Washington Govt. Printing Office, 1882.

For the year ending June 30th, 1882, Dr. Hamilton reports that 36,184 patients received relief, 13,048 being treated in hospital, and receiving in all 333,475 days of hospital relief. The remainder were treated by prescriptions from dispensaries.

The receipts of the service were $408,215 69, and the net expense of the service was $413,928.14, in addition to $54,199 02 expended for alterations and repairs in hospital buildings. The greater part of the report is taken up with medical statistics and reports of cases, in the number and fullness of which it is a decided improvement upon its predecessors. An appeal is made for the establishment of a national sailor's home for aged and infirm sailors, but we doubt either the necessity or propriety of such an institution.

A brief paper on the hygiene of the steamboats on the Ohio River, by Dr. Wyman, deals rather with the ill treatment received by the deck hands from mates, etc., than with the hygienic condition of the boats, and proposes to have the government "compel the erection of quarters and humane treatment of the crew." On this principle the government would become very paternal indeed; in fact, it is difficult to say where it should not interfere.

BOOKS RECEIVED.

BY-LAWS WITH RESPECT TO NEW STREETS AND BUILDINGS, ETC., BOROUGH OF LEEDS, ENGLAND.

SECOND ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF NEW YORK, transmitted to the Governor Feb. 8, 1882. Albany. Weed, Parsons & Co.

HIRAM SIBLEY & CO'S SEED CATALOGUE for 1883. Rochester, N. Y.

SIXTH ANNUAL REPORT OF THE MANAGERS AND OFFICERS OF THE STATE ASYLUM FOR THE INSANE at Morristown, N. J. November 1, 1881.

DISCUSSION ON THE CURRENCY NEEDS OF COMMERCE, BETWEEN BUSINESS MEN OF WIDE EXPERIENCE. The New York Mercantile Journal Co.

REPORT ON DIFFERENT SYSTEMS OF SEWAGE DISPOSAL. By Mr. C. F. Hancock. Presented at the meeting of the Hendon Local Board, held Nov. 25, 1882.

We have received from F. W. Hatch, M.D., Secretary of the State Board of Health of California, THE SEVENTH REPORT of the board from July 1880, to December 1, 1881.

JAPAN, ITS ARCHITECTURE, ART AND ART MANUFACTURES. By Christopher Dresser, Ph.D., F.L.S. Scribner & Welford. New York, 1882.

Construction Notes.

HARTFORD, CT.—The City Council has passed a resolution ordering the street commissioners to report the cost of a stone bridge at the Asylum street crossing.

HAMILTON, ONT.—The Sewer Committee have had plans and estimates prepared for a brick sewer from Strachan street to the bay, to cost $15,000.

PHILADELPHIA, PA.—In Common Council Friday, Dec. 29, the building of new sewers was authorized on 18th street north of Green; on 47th, from Westminister avenue to Weyalusing street. The building of oval sewers was authorized on 22d street, from Chestnut to Sansom, on Marshall street, from Venango to Erie avenue, and on Mountain street from 8th to 9th.

CHICAGO.—The annual report of Superintendent Cheney, of the Sewer Department, contains the following items: Linear feet of sewers constructed, 98,908, or nearly 19 miles. About $175,000 was expended for cleaning sewers, $20,000 for raising catch basins and man-holes, and $5,000 for general repairs. The superintendent will ask for $240,000 next year, and recommend the completion of the 22d and Wallace street sewers and the construction of a sewer on Milwaukee avenue, from Indiana street to the river.

WATERBURY, CONN.—In his message Mayor Kendrick says that the construction of the new sewers will be begun at the earliest practicable moment. The Board of Sewer Commissioners will bring the main sewerage system to as speedy a completion as possible, always allowing for the magnitude of the work and the care necessary to be observed in the undertaking. The main system once perfected, the proper and durable paving of the main streets will follow as a matter of course.

YORKTOWN, VA.—The following bids for the monument were opened at the office of Mr. R. M. Hunt, architect, in this city, the 4th inst.: Daniel C. Hutchinson, New York, $74,000. Mount Waldo Granite Company Works, Frankfort, Me., $74,500. Western Granite Company, Virginia, $74 987 97. Bodwell Granite Bompany, Rockland. Me., E. H. Lowrey, President, $60,436. Hollowell Granite Company, Hollowell, Me., $58,500. David Tilson, Rockland, Me., $60,000. Brown, McAllister & Co., New York, $115,000. Hollowell Granite Company, Hollowell Me., $59,487 if built of Hollowell Granite, $59.939 if built of Westerly Granite, and $5 entra for each letter of the inscription if they are to be raised. E. C. Sargent, of the Concord Granite Company, Concord, N. H., $99,000. The latter's bid was not on the regular blanks prepared for the purpose and was declared informal. The bids will be presented to the Secretary of War and on his judgment the award will be made.

NEW YORK.—The Department Public Works will receive estimates until Jan. 16, for flagging and curbsones on streets around Fulton market.

SAN FRANCISCO.—The Freeholders, at their meeting, Dec. 28, adopted a resolution providing for the insertion of a clause in the charter, which empowers the Supervisors to acquire by purchase, or otherwise, water rights which will make the city independent of private companies.

ALLEGHENY, PA.—James Brown, Comptroller, will receive proposals until January 15 for the construction and erection of one or more pumping engines for the water works.

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UTICA, N. Y.—The City Surveyor is surveying and preparing plans for a brick sewer through the "Gulf" to South street.

PHILADELPHIA.—The Chief Engineer of the Pennsylvania Railroad, W. H. Brown, will receive proposals for labor and material for masonry and piers for a bridge over the Schuylkill River at Manayunk, until January 15.

DURANGO, COL.—Proposals for constructing water works will be received by F. W. Barnes, Clerk of Board of Trustees, until January 17. Proposals will be received for two systems, gravity and turbine wheel with reservoir.

WATER WORKS OF PRUSSIAN CITIES.

The *Zeitschrift des Königl. Preussischen Statistischen Bureaus*, for the year 1882, contains a report by Dr. Eulenberg on the water supply of Prussian cities from which we make the following extracts.

I. Königsberg. The present water supply of this city was established in 1874, and is collected from the ground water of a belt of sand by means of a canal having an egg-shaped section with a height of 1 metre, a breadth of 0.65 metres, and being 5168 metres long. Its bottom is at an average depth of 4 metres. The ground water collects in this, and flows with a fall of from 1-2000 to 1-3000 into a subterranean collection tube which has a capacity of about 150 cubic metres. From this it flows by gravity through an iron main to a covered reservoir having a capacity of about 4630 cubic metres. From this it is distributed by two mains, one supplying the lower zone of the city and having a head of 30 metres, the other supplying the upper zone through a pump which raises the water 15 metres into a high reservoir of iron having a capacity of 500 c. m. The daily supply is 6000 cubic metres and is at present sufficient, but the projected system of sewerage of the city is carried out, there will be a demand for 22,500 c. m. and other sources of supply must be secured.

II. Berlin is in part supplied by water works and in part by 1133 public wells. The Eastern water works, which take their supply from the river Spree, were constructed by an English company in 1852, and purchased by the city in 1874. The water is purified by sand filters and forced through the mains by steam pumps. There are 11 filter basins with a total area of 37890 square metres. Three of these basins are cleansed each summer. The supply is 3720 c. m. per hour. The Western water works, established in 1877, derive their supply from 23 wells which furnish 1800 c. m. per hour. The total length of the pipes of the two systems was on March 31, 1879, 476036 metres, with 3,474 public hydrants, 14,148 premises with 814,642 persons were supplied, a water metre being attached to each house. The old wells of the city are very impure. Recently a number of iron drove wells, having a depth of about 30 metres have been put down, and the supply from these is thus far good.

III. Frankfort, on the Oder, has water works established in 1872. The water is collected by wells connected by tunnels, giving a supply of between 3000 and 4000 c. m. daily.

IV. In Stettin, water works were put into operation in 1865. The supply is from the Oder—is passed through three filter basins, and then pumped to an iron reservoir containing 3000 c. m. and about 50 metres above the river. The daily supply is r2360 c. m. delivered to 1530 houses.

V. Stralsund has an artificial water supply which dates from the 13th century.

VI. Breslau has water works established in 1871, and which have cost 2,473,164 marks. The supply is from the Oder, and is passed through filter basins from which it flows by gravity to a reservoir. From this it is pumped to a higher distributing reservoir. The daily supply is about 22488 c. m.

VII. Erfurt. The water works were begun and completed in 1875. The water is collected from wells in a sandstone formation, and is then raised to a reservoir about 40 metres above the level of the city, by a series of iron mains 20957 metres in length. The daily supply is about 6235 c. m. The reservoir contains 4000 c. m.

VIII. Kiel. The new water works were opened in the summer of 1880. The supply is from 7 wells and amounts to about 5000 c. m. per day. The supply is constant from a high reservoir containing 2000 c. m.

IX. Frankfurt-on-the-Main. The water works were begun in 1872 and finished in the following year. The supply is from springs and amounts to 600,000 cubic feet per day. The majority of the cities depend upon springs and wells for their water supply, and it is often impure. Iron drove wells are coming into extensive use and are an improvement on the old forms.

It is to be regretted that the report does not include the cost of the water works or any details as to rules and management.

The West Side Relief Association and Seaside Sanitarium has dissolved its corporate organization, leaving balance of funds with the manager, Mr. Henry King, that he may open the Sanitarium again on a private basis. The total contributions for the two branches of the work during seven years have been for Seaside Sanitarium $40.969.-05, and West Side Relief, $25,346.31.

Mr. Wm. Baldwin, Commissioner of Highways of Philadelphia, died of heart disease, Jan. 1.

Mr. Walter Thorn, shore inspector, has received a complimentary letter from the citizens of Gravesend and New Utrecht, for the zeal and efficiency with which he has discharged his duties.

Dr. John E. Addicks, Health Officer of Philadelphia, died suddenly, on Thursday night, at his residence, 1,104 Girard avenue, after but at hour's illness of congestion of the lungs. Mr. Addicks was 70 years of age, and has been Health Officer of Philadelphia for the past twelve years.

The Bordentown, N. J., water works were destroyed by fire, January 2.

The sub-committee of Councils on survey have requested the chief engineer of the survey department to prepare an ordinance for presenting to council regulating house ventilation, sewer connections, etc. The same to be presented at the meeting of the committee on January 16.

NEW YORK TARTAR WORKS AGAIN.

A suit by Sylvester M. Beard against the New York Tartar Company and the Royal Baking Powder Company to secure a perpetual injunction restraining the defendants from conducting the manufacture of cream of tartar and baking powder in their works at the foot of Morton street (Wallabout district) was commenced in Brooklyn last Thursday before Judge Clement without a jury. It is expected that the trial will last for some time and that much medical and scientific testimony be presented. The plaintiff is said to have subpœnaed upwards of a hundred witnesses.

An important decision has been pronounced relative to the removal of a child having an infectious disease to a hospital. Section 124 of the Public Health Act provides that, if it shall appear on a certificate of a medical man that a person is laboring under such a disease, and that the patient is in want of proper accommodation, a magistrate may make an order for the removal of such a person into a hospital. In a recent case of "Booker *v.* Taylor," which arose at Coventry, there was such a certificate and such an order; but the mother of the child obstructed the removal and was summoned for the offence. At the hearing, the magistrates entered into the question of the validity of the order, and declined to convict; and the question being carried before the Court of Queen's Bench, as to whether the magistrates were justified in taking the course they had done, or ought to have convicted, Mr. Justice Field and Mr. Justice Stephen were clearly of opinion that the magistrates had no right to go behind the order, and enter into its validity, and were bound upon the evidence to convict if there had been an obstruction. The Court therefore sent the case back to the magistrates with that direction. —*British Medical Journal.*

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

No. 123 Bowery, one b store; cost $23,000; a, J. S. Wightman; b, D. C. Weeks & Son ...Old Slip, one br st trimmed Police building; cost $100,000; o, N. Y. City....Pike Slip, w s, bet Cherry and Water sts, one b flour mill; cost $75,000; o, Geo V. Hecker; a, Wm Field & Son....Madison av n w cor 59th st, one b and terra cotta apart house cost $200,000; o, Thomas Kilpatrick; a, C. W. Romeyn & Co; b no selected....321, 323 and 325 e 64th st one b stable and storage; cost $5,000; o, Geo Mulligan....82d st, s s, 375 e Second av, one b ten; cost $16,500; o, Lottie Seebald; a, John Brandt.

ALTERATIONS, NEW YORK CITY.

No. 172 Suffolk st, cost $2,500: o, St Joseph Asylum....Broadway w s, from Canal to Lispenard sts "The Brandreth House," o, Brandreth estate; a, Hugo Kafka....77 Murray st, repair damage by fire; cost $3,700; o, Thos Adams; a and b, H. Wallace ...Broadway, s w cor 41st st, alter gallery; cost $15,000; lessee, S. M. Hickey; o, The Metropolitan Concert Co; a, H. J. Dudley....253 Grand st, damage by fire; cost $2,500; o, estate R. Cochran; b, John Leslie.

BROOKLYN.

Hooper st, n s, 100 e Bedford av, two br st dwell; cost ea $6,000; o, Frederick Hoeft; a, E. F. Gaylor; b not selected. ..Atlantic av, s s, 236 e Rockaway av, four fr dwells; cost ea abt $2,500; o and b, Chas. J. Holmmer; a, T F. Thomas....Fourth av, s e cor 7th st, three b tens; o, S. S. Graether & Co; a, Leonard & Grether; b, Marx Sohirop & Co... Lafayette av, n s, 100 w Lewis av, sixteen fr dwells; cost ea $3,500; o, etc,; P. F. O'Brren .. Suydam st, n s, 100 e Broadway, two fr dwell; cost ea $2,800; o and b, Fr. Herr; a, Wm Clement.

ALTERATIONS, BROOKLYN.

Second st, w s, 125 s Broadway, b extension; cost $2,500; o, Henry Meyers; b, J. McQuade and Jenkins & Giles.

BOSTON, MASS.—478 E 6th st, 1 fr lumber shed; o, A. M. Stetson & Co.; b, Hoolbrook & Harlew....480 E 6th st, 1 fr storage house; o; A. M. Stetson & Co.; b, Hoolbrook & Harlew....Treamont Court, 1 fr stable; o, Byron A. Atkinson; b, Freeman Hopkins ....Blake st, 1 br stable; o, Mrs. Annie Fryer; b, Alex M. Fryer ....Downer av, 1 fr dwel; o, Mrs. E. L. Burdett; b, Ed. McCeshnie....115 Paris st, 1 fr carriage house; o, Frank McCausland; b, Paul Bailey....Falcon st nr Putnam st, 1 fr storage: o, Eugene S. Folger; b, N. Buchanan... Newman Pl, 1 fr dwel; o, Leander B. Abbott; b, Leander B. Abbott....11 Line st, 1 br stable; o, Saml. Gregory; b, S. B. Bennett....322 Beacon st, 1 br stable; o, R. D. Evans; b, Woodbery & Leighton....48 Gloucester st, 1 dwel; o, Vinal & Dodge; b, Vinal & Dodge....50 Gloucester st, 1 dwel; o, Geo. Wheatland, Jr.; b; Vinal & Dodge....52 Gloucester st, 1 dwel; o, Geo. Wheatland, Jr.; b, Vinal & Dodge....54 Gloucester st, 1 dwel; o, Geo, Wheatland, Jr.; b, Vinal & Dodge ....56 Gloucester st, 1 dwel; o, Geo. Wheatlaed, Jr.; b, Vinal & Dodge ...191 Marlboro st, 1 br stable; o, Sam'l T. Ames; b, Sam'l T. Ames....336 Marlboro st, 1 br stable; o, Samuel T. Ames; b, Sam'l T. Ames.

CHICAGO, ILL.—Jackson Boulevard s e cor Hermitage av, St. Jarlath's stone church; cost $40,000; o, Archbishop of Chicago; a, Egan; b, not decided... Walnut av below 29th st, br and st Sodality hall; cost $12,000; o, Archbishop of Chicago; a, Egan; b, James Conley....N w cor Chicago and Cass st, st and pressed br flats; cost $90,000, Sexton et al; a, Egan; b, Sexton et al... 170 Madison st, br addition; cost $10,000; o, Geo. Harding; a, E. Burling; E. Burling....746 748 Jackson boulevard, st dwel; cost $30,000; o, o, Ira Brown; a, Cleveland & Gay; b, Geo. Lehman .. S Water 41, br store; cost $12,000; o, Hans P. Schilling; a, E. Baumann; b, C. P. Mullen....57 E. Pearson st, br dwel; cost $7,000; o, Thos. Minchin; a, J. Zittel; b, Eberthauser & Bro....49 Peck court, br dwel: cost $10,000; o, F. E. Hawkins; a, Jno. Addison; b, Jno. Cox....550 Jackson st, br dwel; cost $12,000; o, Dr. Norman Bridge; a, James R. Willett; b, by day....3610-3612 State st, 5 br stores and dwel; cost $15,000; o, Toolen & Maloney; a, Jno. Allen; b, Toolen & Maloney....363 Ellis av, 1 br dwel; cost $6,-000; o, Mrs. Day; b, by the day.

DENVER.—Broadway, dble b dwell; cost $10,000; o; S. A. Shepherd; a, F. E. Edbrooke & Co; b, Harvey & Washburn... Broadway, dble b dwell; cost $8,000; o, C. J. Clarke; a, Littlefield ...16th and Holliday sts, b theatre; cost $40,000; o, P. T. Hughes; a, W. Quagle ...28th and Lawrence sts, b dwell; cost $3,000; o, P. McGill; a. E. P. Varian....South 15th st, dbl; cost $7,000; o, W. M. White; a, E. P. Varian....Curtiss st, b store; cost $50,000; o, Reithman; a, E. P. Brink.

NEW HAVEN, CT.—York st, block four b dwells; cost $10,000; A. H. Bartlett....River st, b factory; cost $8,000; o, N. H. Pipe Bending Co....James st, fr dwell; cost $2,500; o, J. Carey....Crown st, block of three b dwells; cost $18,000; o, Maria H. Robertson a, L. W. Robinson; b, Bunnell & Sperry.

PHILADELPHIA, PA.—McKean, w of 8th st, 5 br dwells; b, J. C. D. Smith... Mildred and McKean, 2 br dwel; b, J. C. D. Smith ....Alder n of Norris, 2 br dwel; o, Michael Smith....Terrace and Adams, br Mission bldg. b, Sylvester Yardley... Main, e of Shurs Lane, rebuilding factory; o, S. S. Keeley....Sophia s of Edwards, 2 br foundries; b, T. Shoemaker....Cherry e of 13th st, 3d, 4, and 5th story additions; b, J. Mundell....Allens Lane bet Mt. Airy ave and Gowen ave, alt school h; c, H. Pufe.... Cowy st n Vine, 2½ s br; cost, $6,000; o, Jacob Hass; b, Jos. A. Kuhlman... Cor Hand Alley and Clark st, 4 2 s brs, cost, $5,000; o, John Empson; b, C. Jliff

ST. LOUIS, MO.—Chestnut st bet Garrison and Cardinal avs, eight b dwells; cost ea $5,000; o, D. M. Houser; a, C. E. Illsley; con, J H. Dunlap....Poplar st. bet 20th and 21st sts, warehouse; cos. $5,000; o. Union Dep S. & S. Co.; con, S. W. E. Bent,

WASHINGTON, D. C.—1 3 story and cellar, b, cor Conn ave and R sts; cost, $8,500; o, J. C. Train; a, Gray and Page; b. Chas. Burdette....1 3 st and basement, 9th bet 6th and 7th. $5,000; W. J. Newton; a, W. Z. Partello; b, W. Z. Partello....3 2 s and basement, cor 21 st and M, cost, $9,000; o, Edw. Wilson; b, Edw. Wilson....1 4 sb warehouse, Pa. ave bet 6th and 7th, cost, $15,000; Jno. E. Kendall; a, Jno. Frazer; b, D. B. Groff.

MISCELLANEOUS.

ALBANY, N. Y.—A building to cost $8,000 will be erected on Jay street for the Sunday school of St. Pauls church.

BRIGHTON, COOK CO., ILL.—St. Agnes' Church, pressed br and st. cost $18,000; o, Archbishop of Chicago; a, Egan; b, Ed. Hayden & Jno. B. Segars.

DETROIT.—No 249 Columbia st, b warehouse; cost $8,000; o, A, C. Varney....Fort st west, b bldg; cost $5,000; o, J. B. Wilson.

IRVING PARK, ILL.—Ground for the foundation of the new high school b'ld'g, costing $15,000 was broken last week.

KENOSHA, WIS.—St. Mark's Church, early English Gothic, st and frescoed br; cost $30,000; o, Archbishop of Milwaukee; a, Egan; b, John Coy.

SINSINIWA MOUND, GRANT CO., WIS.—Convent school br and st; cost $60,000; o, Benedictine sisters; a, Egan; b, John Keenan.

TOLEDO, O.—Cor Jefferson and Clair sts; br block, 100 x 75 ft, replacing hall block burned; cost $100,000; o, Conn. Mutual Life Insurance Co.; a, Palmer & Spinning; b, contract not let yet.

WATERBURY, CT.—The new armory, 138x72 feet, two stories, will be pushed to completion; a, R. W. Hill; plumbers, E. R. Lampson & Co.

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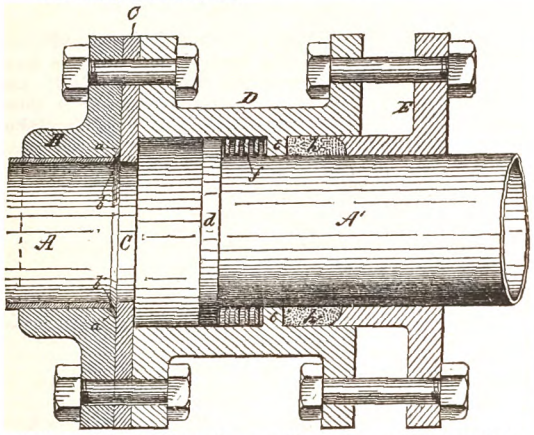
Patents.

[It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.]

264,965. EXPANSION COUPLING FOR STEAM PIPES. LEVI SHOOK, Pittsburgh, Pa. Filed July 29, 1882. (No model.) Issued September 26, 1882.

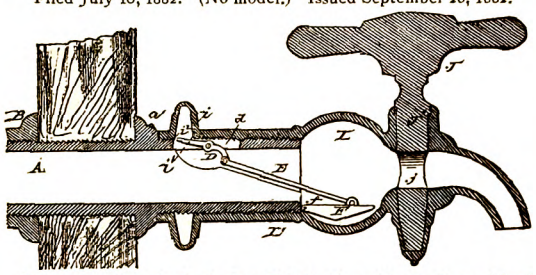


Claim.—1. In a steam-pipe coupling, the combination of the flanged sleeve B, beveled, as at *a*, pipe A, expanded to form the lip *b*, and a metallic plate or washer C covering said lip *b*, and suitable means for clamping the said washer against the face of sleeve B, substantially as described.

2. In a steam-pipe coupling, the combination of flanged sleeve D, having annular rib *e*, gland E, and packing *h* with the pipe A[1], having collar *d* and the spring *f*, substantially as described.

3. The steam-pipe coupling consisting of flanged sleeve B, beveled, as at *a*, pipe A, having lip *b* plate-washer C, flanged sleeve D, having rib *e*, pipe A[1], having collar *d*, spring *f*, packing *h*, gland E, and connecting-bolts, combined and arranged substantially as described.

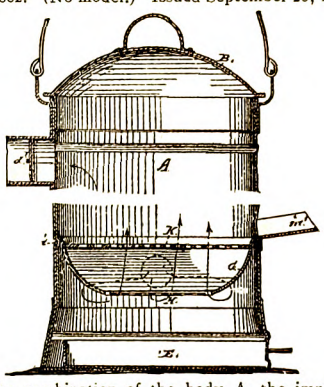
265,053. FAUCET. GEORGE T. FREEMAN, Whippany, N. J. Filed July 10, 1882. (No model.) Issued September 26, 1882.



Claim.—1. The shank A, door F, link E, and lever D, combined with the cap H, having cylindrical portion *h* and threaded portion *h*[1], and the whole adapted to serve as set forth.

2. The combination of the shank A, as described, the door F, link E, and lever D with the faucet I, having shank I[1], and annular recess *i*, as and for the purposes specified.

265,157. TINMAN'S FURNACE. DAVID M. SHOEMAKER, Columbus, Ohio, assignor to L. S. Ayres, same place. Filed May 31, 1882. (No model.) Issued September 26, 1882.



Claim.—The combination of the body A, the imperforate fire-pot G, having the grates K and H located therein, one above the other, said body being provided with the air-inlets L, located opposite and about the imperforate fire-pot, and the exit-flue D *d*[1], located above the fire-pot, and the intermediately-located shelf and entrance *m*[1], substantially as shown and described.

265,169. MACHINE FOR TAPPING WATER AND GAS FITTINGS. ELIJAH F. SPAULDING, Erie, Pa., assignor to the Jarecki Manufacturing Company (Limited,) same place. Filed Apr. 5, 1882. (No model.) Issued September 26, 1882.

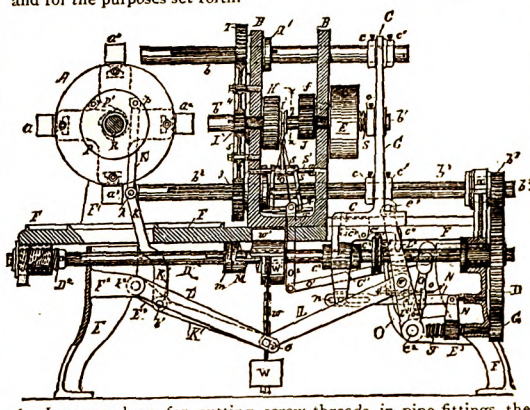
Claim.—1. In a screw-cutting machine, the combination, with the revolving fitting chuck-frame having a ratchet thereon, of the pawl-carrying plate P, pawl *p*[1], connecting-rod K, elbow-lever K[1], chain W, and drum W[1], substantially as and for the purposes mentioned.

2. In a screw-cutting machine having a series of chucks mounted on a revolving frame, and a series of taps and tap-spindles for operating upon fittings held in said chucks, the combination therewith of a carriage, C, yoke C[1] shaft D, and lead-screw D[2], substantially as set forth.

3. In a machine for cutting screw-threads in pipe-fittings, a revolving chuck-frame, A, with a series of chucks, *a a*[1] *a*[2] *a*[3], thereon, in combination with the tap-spindles *b b*[1] *b*[2], the carriage C, lever L[2], and toggles L L[1], substantially as and for the purposes set forth.

4. In a machine for cutting screw-threads in pipe-fittings, a revolving chuck-frame, A, with a series of chucks, *a a*[1] *a*[2] *a*[3], thereon, in combination with the tap-spindles *b b*[1] *b*[2], the carriage C, lever L[2], toggles L L[1], lever K[1], rod K, pawl-carrier P, and pawl and ratchet P[1] R, said lever K[1] being connected to and moving with the toggles, whereby the said chuck-frame is revolved at the same time that the carriage is drawn back, as set forth.

5. In a machine for cutting screw-threads in pipe-fittings, the combination, with the carriage C, which carries the tap-spindles, of a yoke C[1], upon a lead-shaft, the connecting-pin *c*[3], lever *c*[4], pin *c*[5], collar *m*[1], bar M[1], pin *m*[2], collar *m*, and clutch M, substantially as and for the purposes set forth.



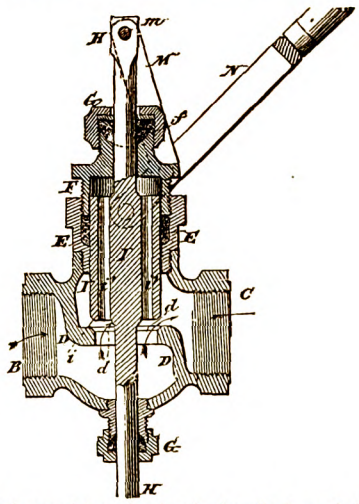
6. In a machine for cutting screw-threads in pipe-fittings, the combination with the tap-spindle-carriage and the devices by which it is moved from the lead-screw and made detachable therefrom, substantially as shown, of the levers L[2] L[1] L, drum W, clutch M, rod M[1], and lever O, substantially as shown.

7. In a machine for cutting screw-threads in pipe-fittings, a reversing apparatus consisting of the following elements: a shifting-frame bearing a yoke which engages with the clutch-collar, a swinging lever having one end formed into a whip-spring and connected with said shifting parts, spring catch-bars which engage with said shifting parts, and a cross-head on said swinging lever for disengaging said catch-bars, substantially as shown.

8. In a machine for cutting screw-threads in pipe-fittings, the combination, with the shifting apparatus, of the following elements: the screw *g*, nut N, rod N[1], adjustable tappet-jaws *o o*, pin *o*[2], lever O, and means, substantially as shown, for connecting said lever O with the said shifting apparatus.

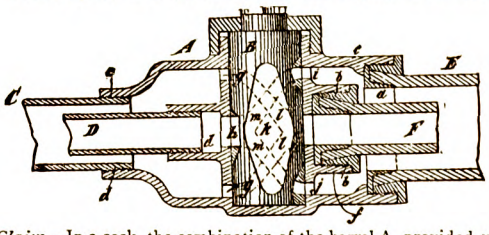
265,178. BALANCE GLOBE-VALVE. MARQUIS D. L. SWANK, JASPER T. THORNLEY, and JOHN A. AWALT, Anderson, Ind. Filed Jan. 27, 1882. (No model.) Issued September 26, 1882.

Brief.—The valve I has the apertures I[1] longitudinally through it to allow steam to pass to both sides of the valve, and thus balance it.



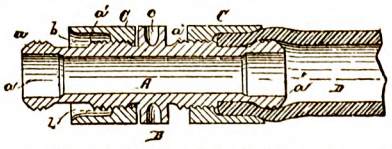
Claim.—The balance globe-valve herein described, consisting of the body-casting A B C, having curved arms D and valve-seat *d*, the valve I *i*, having longitudinal apertures I[1], and steam H, working at right angles to the direction of the current, the valve-cap F, having packing-gland *f*, the caps G, packing-chamber E, and operating means *m* M N, all arranged and combined to operate as and for the purposes set forth.

265,194. COCK. MAURICE J. WALSH, New York, N. Y., assignor, by mesne assignments, to Louis Fitzgerald, same place. Filed July 20, 1882. (No model.) Issued September 26, 1882.



Claim.—In a cock, the combination of the barrel A, provided with the ports *h i g j*, and the plug provided with the ports *k l m*, substantially as specified.

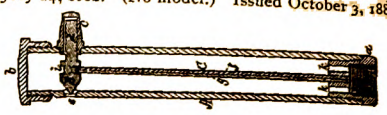
265,218. HOSE-COUPLING. CHAS. CHADWICK, Hannibal, Mo., assignor of one-half to Peter B. Groat, same place, and Andrew McNally, Chicago, Ill. Filed June 19, 1882. (No model.) Issued September 26, 1882.



Claim.—1. The combination of the tubular part or barrel A, having on its ends the enlargements or bulbs *a a* and on its exterior surface the screw-threaded enlargements or portions *d d*, in combination with the sleeves or clamps C C, internally threaded to engage the parts *d d*, and having interiors otherwise smooth, and adapted to receive between them and the said barrel a hose or pipe, substantially as and for the purposes specified.

2. The barrel A, having thereon the stop or collar B, the screw-threaded enlargement *d*, and the bulb or enlargement *a*, in combination with the screw sleeve or clamp C, run upon the part *d*, and adapted to clamp or pinch the hose or pipe against the bulb *a* substantially as and for the purposes specified.

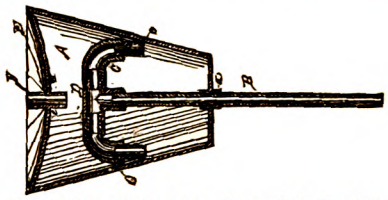
265,239. AUTOMATIC AIR-COCK FOR STEAM-HEAT RADIATORS. GILMAN W. BROWN, West Newbury, Mass. Filed July 24, 1882. (No model.) Issued October 3, 1882.



Claim.—1. In combination with the case A and with the furcated compound expansion-bar C, fastened firmly in position at one end only therein, the thimble *c*, secured to the case near its opposite end, and the valve, grooved to receive the free end of the expansion-bar and provided with the guide-spindle extending within the thimble, all being substantially as set forth.

2. The combination of the guide-thimble, provided with the opening at its outer end and the valve-seat at its inner end, with the case, the furcated compound expansion-bar, fastened firmly at one end only in said case at or near one end thereof, and the valve, grooved to receive the free end of the expansion-bar and provided with the guide-spindle adapted to play in the thimble, all being essentially as shown and described.

265,242. EXHAUST-STEAM TRAP. JOHN E. CHAPER, Cleveland, Ohio. Filed June 26, 1882. (No model.) Issued October 3, 1882.



Claim.—In an exhaust-steam trap, the combination of the chamber A with the pipes B and C, substantially as and for the purposes set forth and described.

264,871. BOILER FURNACE. MARK S. FOOTE, Burlington, Iowa. Filed Aug. 8, 1882. (No model.) Issued September 26, 1882.

246 913. MEANS FOR WARMING RAILWAY CARS BY STEAM. WILLIAM H. WARD, Pittsburgh, Pa. Filed Jan. 19, 1881. (No model.) Issued September 29, 1882.

264,962. ROTARY PUMP. FRANCIS M. ROOTS, Connersville, Ind. Filed Mar. 6, 1882. (No model.) Issued September 26, 1882.

264,990. FIRE-PLACE ATTACHMENT. JAMES P. WINTER, Greenup, Ky. Filed June 5, 1882. (No model.) Issued September 26, 1882.

264,992. STOVE-GRATE. HENRY L. ANDERSON, New York, N. Y. Filed Feb. 10, 1882. (No model.) Issued September 26, 1882.

264,994. STOVE. MICHAEL C. ARMOUR, Chicago, Ill. Filed Oct. 7, 1881. (No model.) Issued September 26, 1882.

265,032. GRATE-BAR AND FURNACE. WILLIAM H. DEVALIN, San Rafael, Cal. Filed July 22, 1882. (No model.) Issued September 26, 1882.

265,089. GRATE FOR BOILER-FURNACES. MURILLO DOWNER and JOSEPH MOHR, Chicago, Ill. Filed Aug. 2, 1882. (No model.) Issued September 26, 1882.

265,066. MANUFACTURE OF REFRACTORY FURNACE-LININGS. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed July 31, 1882. (No specimens.) Issued September 26, 1882.

265,067. ART OF LINING FURNACES, &c. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed June 21, 1882. (No specimens.) Issued September 26, 1882.

265,068. COMPOUND FOR FURNACE-LININGS. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Aug. 10, 1882. (No specimens.) Issued September 26, 1882.

265,069 to 265,075. COMPOUND FOR FURNACE-LININGS AND FIRE-BRICK. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed September 1, 1882. (No specimens.) Issued September 26, 1882.

265,076 MANUFACTURE OF REFRACTORY FURNACE-LININGS AND FIRE-BRICK. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Aug. 23, 1882. (No specimens.) Issued September 26, 1882.

265,077. MANUFACTURE OF REFRACTORY FURNACE LININGS AND FIRE-BRICK. JAS. HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Aug. 31, 1882. (No specimens.) Issued September 26, 1882.

265,080. PUMP. ALFRED A. HINDS, Lexington, Ind. Filed July 24, 1882. (No model.) Issued September 26, 1882.

265,131. UNDERGROUND CONDUIT FOR ELECTRIC WIRES. CHAS. O'BRYON, Philadelphia, Pa., assignor of one-half to John E. Brown, same place. Filed May 23, 1882 (No model.) Issued September 26, 1882.

265,158. FURNACE-GRATE. FREDERICK SHRIVER, Grand Rapids, Mich. Filed May 9, 1882. (No model.) Issued September 26, 1882.

265,163. FIRE-PLACE. JAMES G. SMITH, Cleveland, Ohio. Filed July 22, 1882. (No model.) Issued September 26, 1882.

265,177. FILTER. JOHN N. STEVENS, Toledo, Ohio. Filed Apr. 8, 1882. (No model.) Issued September 26, 1882.

265,217. WINDOW VENTILATOR. EDWARD G. CALDWELL, Newton Centre, Mass., assignor to Georgiana D. Caldwell, same place. Filed May 3, 1882. (No model.) Issued September 26, 1882.

265,222. REGISTERING GAS CONSUMPTION AND MANUFACTURING TO A STANDARD. HENRY H. EDGERTON, Danbury, Conn. Filed April 10, 1882. (No model.) Issued September 26, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING DECEMBER 30, 1882.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.	Other diseases.
NORTH ATLANTIC CITIES.																								
Portland.....Maine	34,519	12	17.7	4	33.3			5								1								
Boston.....Mass	407,581	176	22.4	58	32.9	4	2	31	3	1	16	4	2		3	21	1	10		1	3		1	
*Cambridge.....Mass																								
Worcester.....Mass	64,995	32	25.5	12	37.5			5	1	1	1		1		1	2				2	2			
*New Haven.....Conn																								
Providence.....R. I.	114,723	50	22.4	14	28.0	2		8			4	1	6			3		3		1				
Total	621,818	270	22.4	88	32.5	6	2	49	4	2	21	5	9		4	27	1	13		4	5		1	
EASTERN CITIES.																								
Albany.....New York	98,430	74	39.0	41	55.4	1		5	5	1	1	1	2	1	4	11		5		3			1	
New York.....New York	1,299,249	581	22.9	207	35.4	23	6	104	17	14	17	2	8	9	5	75		38		7	6		8	
Brooklyn.....New York	622,762	200	21.8	106	39.8	4		41	9	3	13			5	14	35	1	22			3	1	1	
*Hudson Co.....New Jersey																								
Newark.....New Jersey	147,744	81	28.5	29	35.8	2	4	11	4	1	2	2	2		3	6	1	3			1		1	
*Camden.....New Jersey																								
Philadelphia.....Pa.	907,043	390	21.8	139	35.6	11	1	42	12		27	3	12	2	6	41	3	12		2		10	2	
*Reading.....Pa.																								
*Wilmington.....Delaware																								
Total	3,086,229	1,392	23.4	527	37.4	41	11	203	47	19	60	8	24	17	32	168	5	80		12	10	11	13	
LAKE CITIES.																								
Buffalo.....New York	168,702	65	20.0	23	35.3	4		5	2	2	5		2		11	3		2						
Rochester.....New York	92,116	26	14.5	5	19.2	2		5			2			1		1	1		1				1	
Syracuse.....New York	54,696	19	18.0	3	15.7	3		2	1					1		5		1			1			
*Cleveland.....Ohio																								
Detroit.....Michigan	131,118	43	16.6	25	58.1			2	4		6		1	1	1	2		2			1			
Chicago.....Illinois	597,834	214	18.5	75	35.0	12	1	19	1	4	11	3	10		9	24	1	6			6	4		
Milwaukee.....Wisconsin	135,233	47	17.7	24	51.0	1		5	1	2	2	1	1	1		5		3	1		1			
Total	1,179,699	414	18.2	155	37.4	22	1	38	10	8	26	4	14	4	21	40	2	14	2		9	4	1	
RIVER CITIES.																								
Allegheny.....Pa.	89,038	28	16.1	8	28.5			4		1			3		1	2	2	1		1				
Pittsburgh.....Pa.	191,523	73	19.7	25	34.2	10		5	1		6	1	12		1	2		1			1		5	
Cincinnati.....Ohio	267,767	106	20.3	34	32.0	4		14	1	2	1	2	3		5	10	2	1		2			3	
Dayton.....Ohio	41,648	14	17.1	7	50.0	1		2			1					3	1							
Louisville.....Ky.	131,529	60	23.4	15	25.0		1	17		2		1	2			5						1		
Indianapolis.....Indiana	86,529	29	17.1	9	31.0	2		2	1	1			5	1	1	2	1	1						
Terre Haute.....Indiana	30,464	4	6.7	3	75.0			1				1				1								
Minneapolis.....Minn	98,026	21	10.9	3	14.2	5		1			1		1			5								
St. Paul.....Minn	53,683	20	19.2	12	60.0		1	1	4		4		2			2		1						
*St. Louis.....Mo.																								
Total	980,207	355	18.2	116	32.6	22	2	47	7	6	13	5	28	1	8	32	6	5		3	1	1	8	
SOUTHERN CITIES.																								
District of Columbia.....Wh.	136,471	46	17.1	11	23.9	2		3		2	2		2	3	2	1	1	1			2		1	
" " .....Col.	71,103	29	21.2	10	34.4	2		10			1					1	2							
Richmond, ...Va. Wh.	38,526	16	21.3	6	37.5	1		4							1								2	
" .....Va. Col.	29,894	19	33.3	7	36.8	1		4								1							1	
Charleston .....S. C. Wh.	22,699	5	11.4								1													
" .....S. C. Col.	27,595	16	29.6	8	50.0	1		3								2	2	1						
Atlanta .....Ga. Wh.	25,583	6	11.9	3	50.0	1		2								1						2		
" .....Ga. Col.	19,221	9	23.9	2	22.2	1		1																
*Savannah .....Ga. Wh.																								
" .....Ga. Col.																								
Nashville .....Tenn. Wh.	31,993	9	14.5	2	22.2	1		3								1						1		
" .....Tenn. Col.	19,406	9	23.9	2	22.2			3								1								
Memphis .....Tenn Wh.	18,677	10	27.6	2	20.0			1		1						2								
" .....Tenn Col.	14,896	11	38.0	6	54.5			1	1	1				1										
*Mobile .....Ala. Wh.																								
" .....Ala. Col.																								
*New Orleans .....La. Wh.																								
" " .....La. Col.																								
Total White	273,929	92	17.1	24	26.0	5		13		3	3		2	3	3	5	1	1			2	1	3	
Total Colored	181,615	93	26.5	35	37.6	5		22	1	1	1			1		5	4	1				2	1	
Total in 30 U. S. Cities	6,323,497	2,616	21.3	939	35.8	101	16	372	69	39	124	22	77	26	68	277	19	114	2	19	27	19	27	
Total for five weeks, ending Dec. 30	6,596,131	13,611	21.4	4,815	35.3	446	83	1,948	390	229	816	59	397	142	376	1,409	126	561	11	107	126	79	103	
" " " " " Nov. 23	5,928,747	11,869	20.4	4,175	35.1	452	83	1,727	339	423	717	25	446	189	288	744	66	399	13	46	113	55	77	
Dec. 16—Total in 28 English Cities	8,469,571	4,370	26.9			107				46	23		79		95					134		6	85	
" " " 8 Scotch "	1,219,586	753	32.1			18				12	19		11		23					14			37	
" " " 16 Irish "	843,553	571	35.2			8		69		9	2		8		18					11			20	

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to December 1, 1882.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending Dec. 30, of an urban population of 6,323,497, there died 2,616, which is equivalent to an annual death rate of 21.3 per 1,000, being very slightly less than the average death rate for the preceding five weeks.

Deaths from small pox are reported in Brooklyn, Philadelphia, Chicago, Louisville, Atlanta and Nashville. Ten deaths from this disease are reported in Philadelphia. Diphtheria and croup continue as in the preceding week.

Taking the deaths in United States cities for the five weeks ending December 30, we find that the mortality was at the annual rate of 21.4 per 1,000, being an increase on the prededing five weeks for which it was 20.4 per 1,000.

This increase is mainly due to acute lung diseases and measles, and has chiefly occurred in the North Atlantic and Eastern cities, especially in the latter in which it has risen from 21.5 per 1,000 for the five weeks ending Dec. 23, to 22.9 for the last five weeks, and for the last week to 23.4, the death rate in Albany and Newark being very high.

The average death rates for the last five weeks have been for North Atlantic cities, 21.8; Eastern cities, 22.9; Lake cities, 17.6; River cities, 19.7. Southern cities—Whites, 17.6; Colored 27.

The proportion of deaths from consumption to the whole number of deaths reported is 14.3 per cent.—a trifle less than it was during the preceding month, while the proportion of deaths from acute lung diseases has risen from 10.3 to 15.4 per cent. of all deaths.

On the other hand diarrhœa, typhoid and malarial fever show a marked diminution. All or nearly all of these changes can be explained by meteorological conditions.

The increase in measles is confined to the North.

The proportion of deaths among children under five years was 35.3 per cent., almost the same as during the preceding month. It is lowest among the Southern whites, where for the five weeks it was 25.2, and highest in the lake cities when it was 38.7 per cent.

Consumption caused 19.6 per cent. of all deaths among Southern blacks, while in the lake cities it only caused 10.1 per cent.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr T. M. Franklin reports three admissions, 18 discharges and three deaths during the week ending Dec. 30, leaving, 1,316 cases of insanity under treatment.

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LOUISVILLE, KY.—Dr. E. R. Montgomery reports that there are no indications of small-pox becoming epidemic.

PITTSBURGH, PA.—Dr. Snively reports three cases of small-pox during the week.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 12 new cases of scarlet fever and three of diphtheria.

BOSTON, MASS.—C. E. Davis, Jr., reports 66 cases of diphtheria, 16 of scarlet fever and eight of typhoid fever.

HUDSON CO., N. J.—The report for Dec. 23 was received too late for insertion in our table in last week's issue. There were 100 deaths; 33 of the decedents were under five years. Accidents caused five deaths, consumption four, croup six, diphtheria five, scarlet fever three and whooping cough one death.

NEW YORK CITY.—The N. Y. *Times* of Jan. 1 gives a summary of the records of the Bureau of Vital Statistics for the year ending Dec. 31. There were recorded 37,951 deaths, 27,321 births, 11,085 marriages and 2,678 still births. During the preceding year the figures were: deaths 38,624, births 26,130, marriages 10,077, and still births 2,462. The largest number of deaths was in July, 4,482 and the smallest in November, 2,461. The marriages and births did not vary much with the months. The largest number of each was in December. The deaths of 13 persons who were alleged to be 100 years and over were recorded as follows: 100, six; 102, one; 103, one; 104, one; 105, two, and 107, two. There were reported during the year the following cases of contagious diseases:

Years—	1882.	1881.	1880.	1879.
Scarlet fever	6,793	7,338	3,048	5,446
Diphtheria	3,504	5,272	3,307	1,783
Typhoid fever	684	965	508	432
Typhus fever	207	568	2	8
Cerebro-spinal fever	234	556	197	119
Measles	4,633	3,116	3,891	2,333
Small-pox	708	1,342	67	65

BALTIMORE, MD.—During the week ending Dec. 30, 161 births were reported and 239 deaths. Of the latter 129 were males and 110 females. Under five years 93, over 60 years 35. The annual rate is given as 30.38—that for the white population being 28.30, and for the colored 42.46. Small-pox caused 71 deaths, croup eight, diphtheria 17, scarlet fever five and whooping-cough one death.

MICHIGAN.—The report of the Secretary of the State Board for the week ending Dec. 23 indicates the prevalence of the following diseases: neuralgia, rheumatism, bronchitis, tonsilitis, consumption, influenza, intermittent fever and pneumonia.

Small-pox was reported at Richmond, Osceola, on the 27th.

NEW ORLEANS, LA.—The report for the week ending Dec. 23 shows a total of 120 deaths. White, males 47, females 32; colored, males 20, females 21; under five years, white 16, colored nine, over 60 years, white 16, colored five. Small-pox caused 13 deaths, typhoid fever one, malarial fevers 11, consumption 23, croup one, acute bronchitis four, pneumonia eight, pleurisy two, diarrhœa and dysentery two, and accident four deaths. Rate 28.14 for whites 25.38, for colored 36.00.

PORT OF BALTIMORE.—Dr. Steuart, Immigrant Inspector, in reporting for the two weeks ending Dec. 31, makes a note of the increased care exercised by English surgeons in the vaccinations performed on shipboard.

ONTARIO, CANADA.—The *Weekly Health Bulletin*, Dec. 16, issued by the Provincial Board of Health, shows the prevailing diseases to have been bronchitis, neuralgia, influenza, anæmia and consumption. Measles are almost absent from the list of diseases, and neither scarlet fever nor diphtheria occupies a prominent place on the list.

KINGSTON, JAMAICA.—Consul Geo. E. Hoskinson transmits the official abstract of births and deaths for Nov. Births 82; males 35, females 47; illegitimate 52; rate per 1,000 26.4; deaths 83, males 34, females 49; rate 26.7. In Nov. '81, the birth rate was 23.7, and the death rate 27.0. Mr. Hoskinson says that malarial and climatic fevers are the prevailing diseases. The city is in a dirty condition and ripe for an epidemic of any kind if once started. Yellow fever has prevailed at Port Royal for a month past, and sixteen deaths have been reported. At last report there were five cases in the hospital. The British fleet has been ordered away. Cautionary bills of health have been issued for late departures.

HAVANA, CUBA.—Dr. Burgess reports 7 deaths in the city during the week ending December 22. Of the decedents, three were citizens. The other deaths occurred in the military hospital.

ENGLAND.—L. H. Mitchell, Vice Consul-General transmits the return for the week ending December 16. The annual rate of mortality in 28 great towns in England and Wales averaged 26.9 per 1,000. The lowest rate was registered in Bristol 18.9, and the highest in Halifax, 37.7. The rate in London was 26.8. The 23 deaths from diphtheria in the 28 towns, included 13 in London, 2 in Birmingham, and 2 in Hull. Small-pox caused 3 deaths in Newcastle-upon-Tyne, and one each in Birmingham, Oldham, and Sheffield.

In London 2,569 births and 1,996 deaths were recorded. Allowing for increase of population, the births were 66 below, and the deaths 182 above the average numbers in the corresponding weeks of the last ten years. Measles caused 97 of the deaths, scarlet fever 41, whooping cough 27, typhoid fever 25, and diarrhœa 20.

SCOTLAND.—During the week ending December 16, the death rate in the eight principal towns was 32.1 per 1,000. This rate is 10.5 above the rate for the corresponding week of last year and 4.1 above that for the previous week of the present year. The lowest mortality was recorded in Aberdeen 24.7, and the highest in Dundee, 36.1. In Glasgow the rate was 35.4. Measles caused 14 deaths in this city, scarlet fever 15, and whooping cough 27.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the Registrar General for the week ending Dec. 16, a summary of which is given in our weekly table.

BRUSSELS, BELGIUM.—During the week ending Dec. 9, there were 302 births and 179 deaths in the city and its suburbs, giving respectively the rates of 38.5 and 23.4 per 1,000 living. Of the decedents 67 were under five years of age. Small-pox caused one death, measles two, typhoid fever, diphtheria, and croup one each, diarrhœa 15, bronchitis and pneumonia 27, consumption 19. No deaths from scarlet fever or whooping cough.

STOCKHOLM, SWEDEN.—Consul Elfwing sends reports for the week ending Dec. 9. There were 110 deaths, males 57, females 53; under five years 41; over 60 years 15, annual rate 32.7. Measles caused three deaths, scarlet fever four, typhoid fever two, puerperal fever one, diphtheria seven, bronchitis seven, pneumonia 13, and consumption 18.

PARIS, FRANCE.—During the week ending Dec. 6, there were 1135 deaths, males 593, females 542; under five years 303, over 60 years 261. Typhoid fever caused 62 deaths, small-pox nine, measles 14, scarlet fever four, whooping cough six, diphtheria and croup 34, erysipelas five, consumption 196, acute bronchitis 48, pneumonia 85, and violence 31.

During the week ending Dec. 13, the deaths numbered 1,094, of which 614 were males and 480 females, 302 under five years and 235 over 60 years. Typhoid fever caused 49 deaths, small-pox seven, measles 16, scarlet fever three, diphtheria and croup 43, erysipelas three, consumption 212, acute bronchitis 45, pneumonia 75, and violence 37.

ST. PETERSBURG, RUSSIA.—Consul General Stanton reports for week ending Dec. 2, the occurrence of 568 deaths, under five years 264, over 60 years 62. Small-pox caused 37 of the deaths. Diphtheria and scarlet fever are also prevailing.

RIGA, RUSSIA.—Consular Agent Bomholdt reports as follows for the month of October: Births 528, males 270, females 258: deaths 336, males 169, females 167. In the previous month there were 478 births and 343 deaths. Causes of death: consumption 41, convulsions 31, pneumonia 26, diarrhœa 14, small-pox 12, diphtheria, ten, typhoid fever ten, croup nine, whooping cough nine, accident six, and puerperal fever three.

WARSAW, RUSSIAN POLAND.—Consul Rawicz reports for the week ending Dec. 9, the occurrence of 237 deaths; population 383,973. Five deaths from small-pox were registered.

VIENNA, AUSTRIA.—Consul General Weaver reports 340 deaths for the week ending Dec. 9, annual rate 23.9. Living births 529, annual rate 37.0. Among the deaths were one from small-pox, one from measles, five from scarlet fever, seven from diphtheria and one each from whooping cough and typhus and typhoid fevers. Consumption caused 77 deaths, acute lung diseases 44.

CALCUTTA, BRITISH INDIA.—Consul General H. Mattson sends reports for the weeks ending November 11 and 18. During the former there were 271 deaths, of which 42 were caused by cholera, 81 by fevers, 32 by diarrhœal diseases and nine by tetanus. The annual rate was 32.6 per 1,000. During the latter there were 274 deaths, of which 61 were caused by cholera, 72 by fevers, 35 by diarrhœal diseases, 18 by tetanus and one by diphtheria. The annual rate was 33.0. The death rate is characterized as moderate for the season, although cholera is above the average.

MADRAS, BRITISH INDIA.—The return for the week ending Nov. 17 shows 253 deaths; males 140, females 113. Rate 33.1. Small-pox caused four deaths, measles two, fevers 55, dysentery 32, diarrhœa 15, No deaths from cholera are reported. That for the week ending Nov. 24 shows 262 deaths; males 138, females 124; rate 34.2. Small-pox caused three deaths, fevers 77, dysentery 23, diarrhœa 11. No deaths from cholera or measles.

COLOMBO, CEYLON.—During the three weeks ending Nov. 8 the total number of deaths was seven, all of which were caused by small-pox. Fifty-seven cases were recorded during this period.

PENANG, CHINA.—Dr. F. K. Hampshire, the senior medical officer of the city, reports 273 deaths during the month of October. Fevers caused 90 deaths, small-pox eight, cholera 14, diarrhœa and dysentery 45 and old age 18. The report does not show the ages of the decedents. Cholera has increased during the month.

SINGAPORE, CHINA.—The monthly statement of the health of the town and suburbs for October shows a total of 388 deaths, of which number eight only were Europeans. Fevers caused 98 deaths, diarrhœa 29, consumption 33, cholera three and small-pox three.

SHANGHAI, CHINA.—Consul General Cheshire, under date of Nov. 14, reports catarrhal affections of the respiratory mucous membrane as common, but not severe. A case of diphtheria has been reported. This is an exceedingly rare disease in Shanghai; the total number of cases observed in the last 15 years not exceeding 20. During the following week a second case was diagnosed wholly unconnected with the first.

SAURABAYA, JAVA.—The cholora reports for the ten days ending Oct. 31 show a decrease in prevalence of the disease. There were 45 new cases reported as against 88 during the preceding 3d of the month. Small-pox has been declared epidemic, but no statistics have been transmitted.

BATAVIA, JAVA.—Consul Hatfield reports, under date of Nov. 25, that although official statistics have not yet been furnished, there is no doubt as to the decline of the cholera epidemic.

NEW ZEALAND.—Thos. T. Gamble, U. S. Vice-Consul at Auckland, transmits the Registrar General's report for Oct., 1882. The births in the various boroughs were 487 against 461 in the previous month. The deaths were 181, an increase of 16 in the month of September; males 101, females 80; under five years, 81, equal to 44.75 per cent. of the whole number. Measles, scarlet fever, diphtheria, croup, and whooping cough are found on the return, the first having caused seven deaths and the last two deaths.

SIDNEY, NEW SOUTH WALES.—Consul Chas. Kahlo sends the Registrar General's report for Oct. Births in Sidney, 290; deaths, 216; males 109, females 107; under five years, 82, over 70 years, 17. In the suburbs the births numbered 539, the deaths 209; males 100, females 109; under five years, 127, over 70 years, eight. Diarrhœa was the prevailing disease. A few fatal cases of croup, diphtheria, and whooping cough was recorded.

ST. PAUL DE LOANDA, AFRICA.—Consul L. de Rdu Verge reports 91 deaths during October, in a population of 12,000; of these 80 were caused by small-pox. The town is in bad sanitary condition. The stench from dead dogs and fish which lie on the streets and cover the beach in front of the town, penetrates everywhere.

MONTHLY REPORTS FOR NOVEMBER.

These reports were omitted from our last issue for want of space.

KNOXVILLE, TENN.—S. B. Boyd, M.D., Secretary Board of Health. Deaths, 19; white males five, females five; colored males six, females three; annual rate 13.29, for white 9.49, for colored 23.05; under five years seven; over 60 years one; consumption three, pneumonia one, and small-pox one.

MACON, GA.—J. Emmett Blackshear, M.D., Chairman Board of Health. Deaths, 25; white males, eight; females, eight; colored males, four; females; 5. Annual rate 17.65, for whites, 21.33, for colored 13.50; under five years, white, seven; colored, six; over 60, white, one, colored, one. Croup one, scarlet fever one, consumption one and malarial fever one.

OAKLAND, CAL.—J. R. Bradway, M.D., Health Officer. Deaths 49; males, 33, females 16; under five years, nine; over 60 years, 11. Annual rate 16.30. Violence, three; consumption, 6; diphtheria, four; pneumonia, three; congestion of lungs, one; bronchitis, two. No deaths from scarlet fever, measles, small-pox or whooping cough. Births, 53; males, 33, females, 20.

PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The first case of the State Board of Health against a grocer of this city for selling adulterated cream of tartar came up for trial before Justices Kilbreth, Smith and Ford at the court of Special Sessions last Monday, Henry Fulle, a grocer of 823 Second avenue, being the defendant. Dr. E. G. Love, State Analyst, testified that the sample which he bought at the defendant's store consisted of 92 per cent. ground gypsum and 8 per cent. tartaric acid. The defendant testified that he bought the article for pure cream of tartar, paying therefor 45 cents a pound. The greater part of the first day was occupied with technical objections, the defendant's counsel at first strenuously objecting to the admission of the Pharmacopœia in testimony, and finally arguing at great length to show the unconstitutionality of the law, and also that it was not in force at the time of the offense, owing to the failure of the Board of Health to comply with a certain proviso contained in the act. At the conclusion of the case on Tuesday morning, the defendant was found guilty, and a nominal fine of $10 imposed, from which decision he appealed. The remaining cases were adjourned on account of the length of time occupied by this, and the number of prisoners awaiting trial.

DIPHTHERIA.

The London *Times* of Dec. 6, in an editorial relative to the illness of Mr. Fawcett, the Postmaster General of England, which illness is said to have been a combination of diphtheria and typhoid fever, remarks with regard to diphtheria, that we have very little knowledge either as to its causes, or the channels of its diffusion.

"We know, if not exhaustively, at least approximately, the methods by which enteric fever, or scarlet fever, or small pox is communicated; and also that these methods are different in the three cases; but about diphtheria we know nothing. Sometimes it appears to be actively contagious, and speedily assumes epidemic proportions in the locality where it occurs; at other times isolated cases are met within houses where many persons are brought into close contact with the sufferer. It is maintained with some probability that people living under unfavorable sanitary conditions are more prone than others to contract diphtheria if they are exposed to it; but something not very unlike this is true of all other diseases. The insanitary conditions have certainly no direct influence either upon its origin or its propagation. A few years ago, an epidemic of diphtheria occurred in one of the London suburbs; and the discovery of a choked main sewer was eagerly hailed as affording an explanation of the facts. Further examination, however, showed that the epidemic had not originated in the region of the sewer in question, and was not only not confined to it, but was neither more prevalent nor more severe there than in adjacent regions, the sewerage of which was sound. There is no evidence that drinking water acts as a channel of conveyance; so that, in a few instances in which the families of the sufferers have obtained their milk supplies from a common source, the attention of investigators has been directed rather to the state of the cows by which the milk was furnished than to the water which, in dairy phraseology, was used to 'rinse the pails;' and a suspicion has been entertained that a diseased secretion from the udder might be the original poison. Since this was the first suggested, there have been two or three diphtheritic outbreaks roughly coinciding with a community of milk supply; but the evidence at present obtained has not been sufficient to connect the two things together with any approach to certainty. Indeed, the hypothesis first formulated on the subject can hardly be said to have been strengthened in any material degree. It is a curious fact that many of the more fatal outbreaks of diphtheria have occurred in remote villages, in some of which a large proportion of the inhabitants have been struck down; and in these a common milk supply would be an ordinary result of the condition of life in the place, and might easily be a mere coincidence.

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It seems to us that this is hardly a fair exposition of the existing state of knowledge about diphtheria, concerning which we probably know as much as we do about enteric fever, or scarlatina. The researches of Drs. Wood and Formad have shown that the cause of diphtheria is a minute organism or micrococcus, which can be cultivated outside of the body, but which under the culture conditions employed by them, rapidly loses its virulence, and that this micrococcus can take on specially contagious and virulent properties, very much as the harmless hay *bacillus* can develop into the deadly *bacillus anthracis* under special conditions of temperature and nutriment. At first it is a strictly local disease, and in the mild and sporadic cases it remains such—the micrococcus does not pervade the system, although some of the products which it secretes, probably an alkaloid, enters the blood and produces fever, etc. In such cases the blood and secretions of the body are not contagious. In the epidemic and virulent form the micrococcus is probably in the blood, for in such cases a wound in any part of the body will become diphtheritic, and a new focus of infection. It is true that we do not know the conditions under which this germ becomes virulent, neither do we know why scarlatina is sometimes mild and at other times malignant. The *Times* is quite right in calling attention to the fact that diphtheria is a village disease, rather than one of large and sewered cities.

PREVENTING THE INTRODUCTION OF CONTAGIOUS DISEASES.

The following bill was introduced into the United States Senate, December 19.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That the tenth section of the act approved June second, eighteen hundred and seventy-nine, entitled "An act to prevent the introduction of contagious or infectious diseases into the United States," and so much of the act making appropriations for the sundry civil expenses of the government for the fiscal year ending June thirtieth, eighteen hundred and eighty-three, approved August seventh, eighteen hundred and eighty-two, as restricts or limits the operations and duties of the National Board of Health, be, and the same are hereby, repealed.

SEC. 2. That of the unexpended balance remaining to the credit of appropriations made for the National Board of Health prior to June thirtieth, eighteen hundred and eighty-two, the sum of one hundred and twenty-four thousand dollars, or so much thereof as may be necessary, is hereby continued and made available for carrying out the provisions of the several acts creating the board and defining its powers during the remainder of the current fiscal year, and for the fiscal year ending June thirtieth, eighteen hundred and eighty-four.

SEC. 3. That of the appropriations heretofore made and still standing to the credit of the National Board of Health to enable it to aid state and local boards of health and local quarantine stations, to be used only in case of epidemic, the sum of one hundred thousand dollars is continued and made available for the same purpose during the fiscal year ending June thirtieth, eighteen hundred and eighty-four.

The statistical report of the year's work of the Auxiliary Sanitary Commission of New Orleans shows that of 17,035 premises inspected, containing 73,574 persons, 14,170 had cisterns, 4,302 hydrants, 1,586 wells and 420 no water. Of the privy vaults 9,464 were in good condition, 7,571 were full or foul, and 1,486 were defective. Sixteen hundred lots had defective drainage. Three hundred and fifty-eight dairies were inspected, of which 117 were in bad condition.

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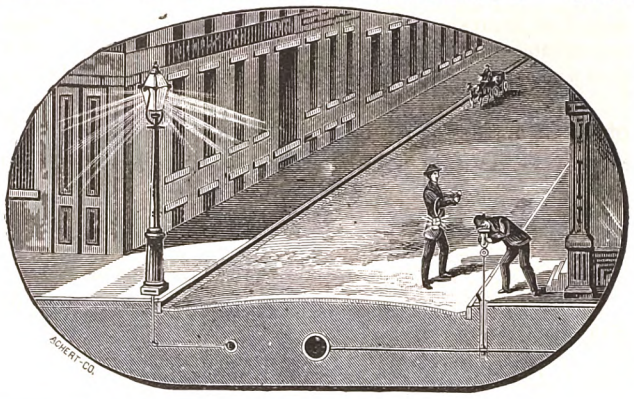

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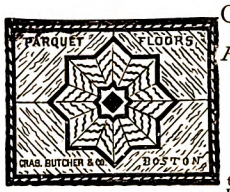

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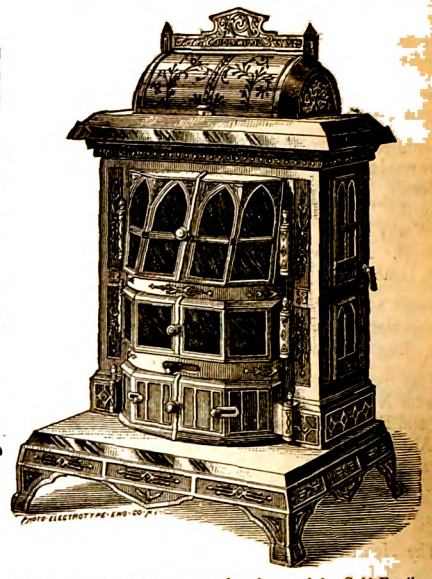

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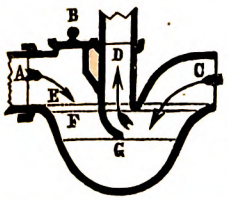

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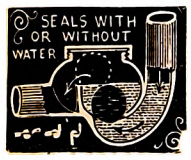

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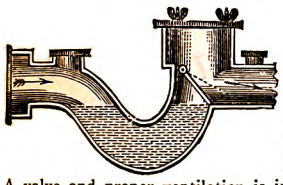

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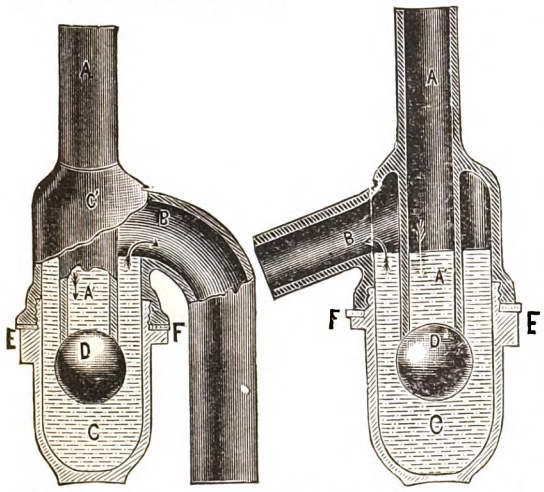

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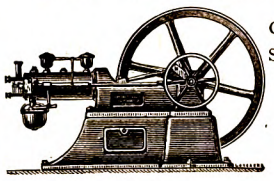

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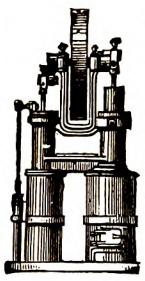

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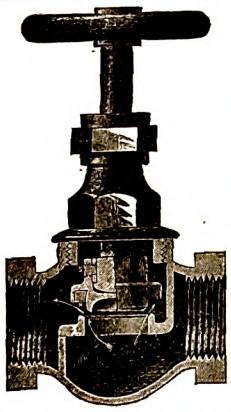

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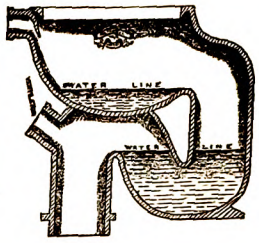

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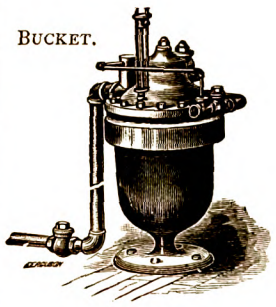

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Automatically drains the water of condensation from HEATING COILS, and returns it to the boiler, whether coils are *above or below* the water level in boiler, doing away with pumps and other mechanical devices for such purposes.
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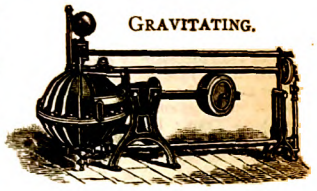

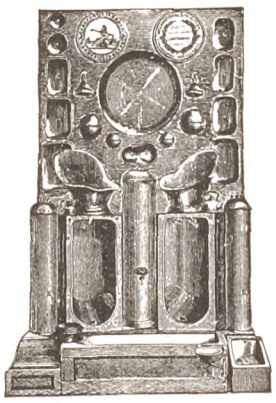

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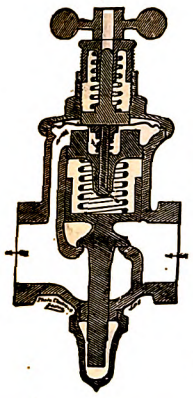

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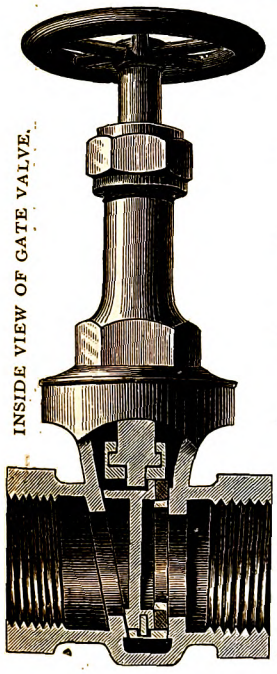

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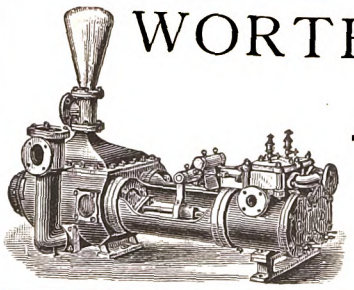

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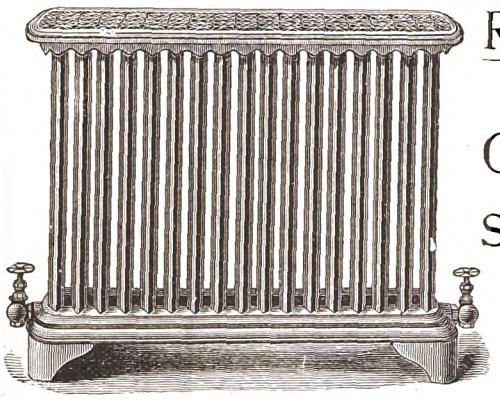

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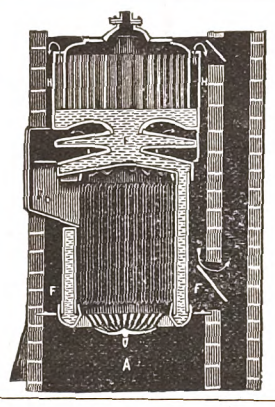

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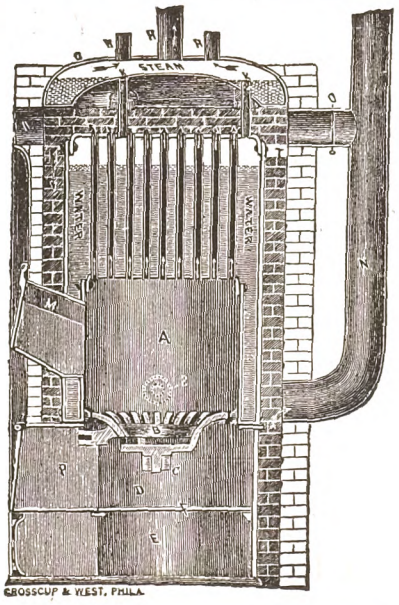

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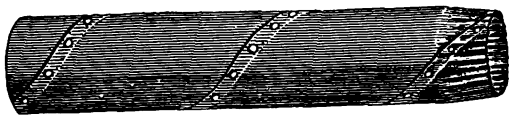

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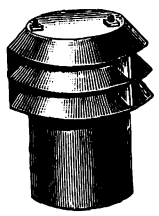

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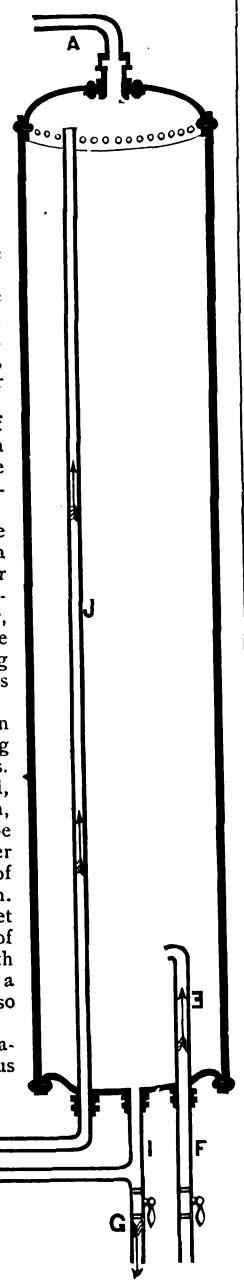

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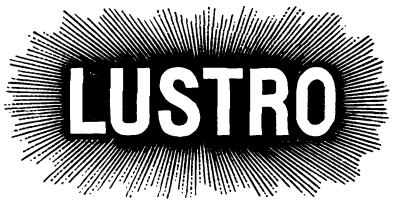

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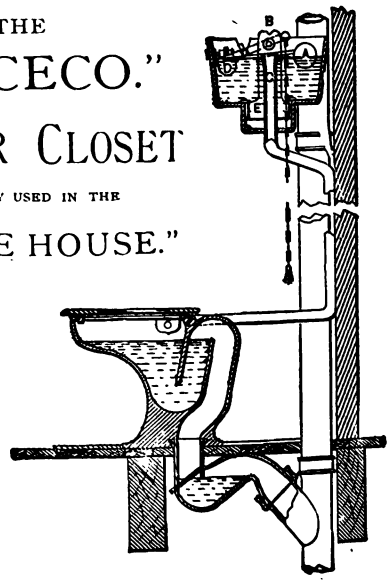

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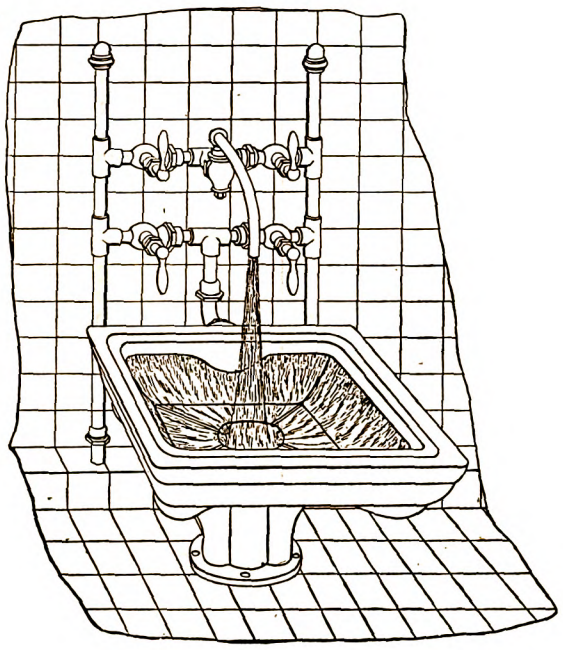
Persons wanting some such thing will find it worth while to take the trouble to call at our warerooms and examine it.



The apparatus complete, as shown, we designate as—

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When the Combination Cocks and the Hoppers only are wanted, it is designated as—

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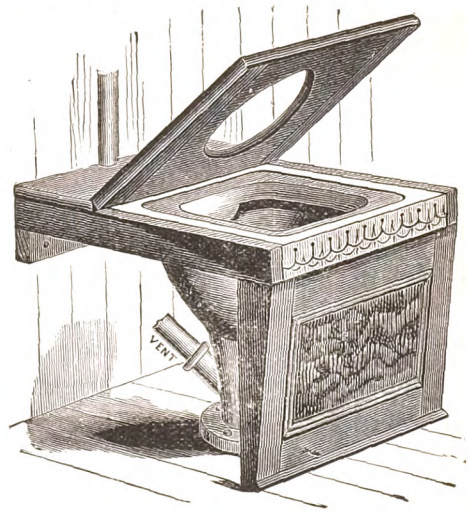
CATARACT HOPPER



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WITH FLUSHING RIM.

This Hopper is so constructed as to admit the riser underneath the front edge, thus preventing the floor becoming wet inside or behind the woodwork.

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THE TRAP VENTILATION PATENT SUIT.

In our issue of February 15, 1881, we announced that a suit had been brought by Mr. John McCloskey against Mr. James H. Young, of this city, for infringement of a patent for ventilating traps. In the issue of November 15, 1880, we noticed this patent at length, and printed an opinion by Mr. J. N. McIntire against its validity.

In the issue of February 15 we stated "we have no doubt that some of our readers can indicate places where traps have been ventilated prior to 1877 in substantially the same manner as claimed by the McCloskey patent, and we shall be glad to print letters giving information on this point." In response to this invitation we received letters and one from Mr. James Tucker, of Boston, we printed. It was subsequently suggested that the printing of letters offering evidence against this patent, then in litigation, would tend to make McCloskey unpopular. As this result we desired to avoid we ceased their publication. But having been instrumental in inducing the public to use this arrangement and having represented that it was not patented (which at the time was the fact), and knowing that it had been in use in Great Britain for more than twenty-five years, and realizing the further fact that wherever plumbing regulations had been adopted this feature was required as an essential in every properly arranged piece of plumbing, we felt that our duty to the community demanded that we should use all proper means to see that the claims of the various parties in interest were thoroughly investigated. With that object in view we retained Messrs. Betts, Atterbury & Betts, counsel widely known as experienced in patent litigations, to examine into the case and consider the new testimony that we were able to submit. Mr. Edward Heaton, Mr. Young's solicitor, thereupon availed himself of the services of these gentlemen as counsel. It was then deemed necessary to have the case re-opened in order that the testimony elsewhere printed might be introduced, and for the reasons there given. Affidavits were therefore presented to the Court indicating the character of the new evidence, and representing that if because of the absence of this evidence, which proved the two years' prior use, a decree should be issued sustaining a patent of this character, it would work a hardship on multitudes of individual houseowners, who would feel forced to pay royalties or damages, rather than assume the great expense of securing the reversal of a decree of the United States Circuit Court. The Court decided to allow the introduction of the testimony referred to; and it was given at length, and with illustrating diagrams, during the succeeding year. The plaintiffs finally withdrew their suit, and paid costs of Court.

An examination of the testimony will, we think, satisfy any one that it is ample to show the prior use in the United States of the feature claimed in the McCloskey patent, and quite sufficient to demonstrate its invalidity. Should at any future time this patent pass into the hands of other parties, and attempts be made to collect royalties from householders, it should be the duty of the local Boards of Health to protect the people under their jurisdiction, and the matter we have printed may be of service in such an emergency.

A bill providing for the registration of plumbers and supervision of plumbing work in Cincinnati has been introduced in the Ohio Legislature, at the instance of the Master Plumber Association of that city. According to the *Commercial Gazette*, Senator Dixon desired that action on it be deferred until it was seen whether the Courts would sustain the law in New York. For the information of the Senator, we would say that on two occasions, thus far, the Courts have sustained the law in this State. The first instance was referred to in our issue of August 3 last, and the Crotty case was mentioned in the issue of January 4, current volume. Moreover, the law is warmly sustained by reputable plumbers, the medical profession, the entire press, and indeed every one but the skin builders and plumbers. We feel sure that if there is a real desire to pass such a law in Ohio, there are lawyers there who can frame a bill that, if enacted, will be sustained by the State Courts.

We were mistaken in our statement last week that the ordinance for the regulation of plumbing in Boston had been finally adopted. After a discussion over the measure in the Board of Aldermen, it was referred to the Committee on Ordinances, with instructions to give the heads of the Water and Health Departments a hearing and report within two weeks. The Society of Architects desire certain changes in the ordinance. They have invited Messrs. William Trainer, Isaac Riley and James Tucker, as representing the views of the plumbers, to confer with them on the changes, and will urge them on the Ordinance Committee.

It would be unfortunate if differences of opinion over the details of the rules should result in a defeat of the entire bill. Indeed, it would be impossible to devise any set of rules that some one could not criticise.

Now it is Philadelphia's turn to join this movement so eminently characteristic of the present tendencies of sanitation in this country,

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and she sends a delegation to this city to inquire into the working of the plumbing law. On the 11th inst. a committee of the Select and Common Councils and the Chief Engineer of the Survey Department visited the Health Departments of New York and Brooklyn and by Col. Clark, Dr. Raymond and others were given the information and documents which will, we hope, result in the passage of an ordinance similar to our law. Should this prove the case, then Boston, Chicago, Washington, Montreal, Cincinnati and Philadelphia, Jacksonville, Fla., and Lawrence, Mass., may all be claimed as converts to the system to which this community was gradually brought after four years of agitation, for each of these cities now either has a law regulating plumbing in force or has progressed so far in discussion that legislation of some sort is sure to follow. Yet it is only eighteen months since the New York bill became a law and ten since it was enforced, with much trembling and fear at first. For a year and half's progress, this is fair.

General James L. Selfridge has been appointed Health Officer of Philadelphia in place of John E. Addicks deceased. We have read attentively the biographical sketch of Gen. Selfridge, published in the Philadelphia *Bulletin* of the 10th inst., and learn from it that he was born in 1824. studied law for a year, and then became successively a commission agent, a clerk, a captain, colonel and brigadier of State troops during the war, an assessor of internal revenue, a candidate for the State Senate, and chief clerk of the State House of Representatives; and also that he is a prominent member of the Masonic Fraternity. We do not learn, however, that he has any of the special knowledge and training which a health officer should possess, and which would be very useful to Philadelphia at the present time. Is it not about time that the health officer of a large city should be selected for his reputation as a sanitarian rather than that of a politician?

Anybody could have told you that there would be a big stir, big demonstration, big inspection, after the Newhall House fire. This sort of thing has been for several years common enough to furnish good basis for prophecy, but he would be a wise man indeed who can tell what permanent results will come of it. On at least three occasions in the past two years there has been a similar stir for a season. First the theatres, then office buildings have been the objects of what must be termed untimely suspended animation. The course of things is about this: big catastrophe, big popular excitement, intense bustle in the department; no disaster, popular indifference, official repose; sum total of results, quite microscopic. Nevertheless we do not imagine that Mr. Esterbrook is to blame. Probably he and the Building Department do all that they can do. The obstacles thrown in the way of efficient action on the part of the Building Department by its organization and the involved manner in which only its decrees can be enforced are, we fear, insurmountable. The Department is about in the condition of the jumping frog—ready enough to leap when prodded, but too heavily loaded to get very far.

AMERICAN ARCHITECTURE AND PLUMBING SEEN THROUGH ENGLISH EYES.

American architecture and plumbing were highly praised at a recent meeting of the Royal Institute of British Architects. The author of the paper, Mr. A. J. Gale, arrived in this country early last summer, and spent some time in the study of representative buildings in the principal cities. Mr. Gale came prepared to find American work much inferior to English; it is evident from his paper that he returned to England with a different impression. What was, perhaps, most surprising to him was the wonderful completeness of American houses and the elaborateness of their construction. He found American clients willing to pay for any comfort that could be procured.

In this city he devoted much attention to the work of the Board of Health and the improved tenement houses. The apartment houses were also a marked feature of the city. They were enormous blocks of buildings seven or eight stories high, and since 1879 80 had been strictly regulated by the New York Board of Health, some particulars of which organization were given. All classes of apartment houses were subject to the same regulations, and were constructed on much the same plans and lines, but in some a great amount of luxury was afforded the tenants. The entrance halls opened upon elevators with well cushioned seats, and running very easily, and the buildings surrounded a courtyard, covered in in the best examples. The walls were of brick, the roofs of iron covered with slates, the staircases of iron, and the floors of iron bedded in concrete, and laid with two thicknesses of boards. The finishing of all woodwork was excellent, and the joinery was superb, and constructed in a great variety of woods. Some of these dwellings were erected by mutual associations, who thus preserved some power of choice of tenants, and in many cases the choice of apartments was put up to auction. During the past year the plumbing arrangements had been regulated by the Board of Health, and the rules were fairly representative of American public opinion on the matter. A curious feature was that the soil-pipe was usually of iron, coated inside and out with enamel or coal-tar pitch. The use of iron allowed the pipes to be suspended from the cellar roof. Lead was condemned as being less smooth, more liable to corrosion, and less easy of jointing. Indeed, there was a general thoroughness about the use of iron pipes which was in advance of English practice.

The ventilation of buildings was, in many cases, very perfect, and he specially studied Dr. John Hall's church (Fifth avenue, Presbyterian), New York, of which M. Carl Pfeiffer was the architect. The building measured 200 feet by 100 feet, and was 60 feet high, being seated for over 2,000 persons. Two towers, each 100 feet high and 60 feet square, formed inlets and outlets for air. The incoming air was received in basement, and in cold weather passed over a set of steam pipes some 9,000 feet long, suspended from the ceiling, the whole basement being thus converted into a heating chamber. The warmed air came up into the pews and could be regulated by the occupants. Twenty-four hours before the service the steam pipes were heated, and throughout the Sunday a powerful fan was rapidly rotated in the outlet tower, drawing off the vitiated and heated air. The windows were all double and the gas burners protected in glass niches. In summer time the incoming air was passed over ice. A steam pump and fire hydrants were provided to prevent accidents. Madison Square Theatre was ventilated and warmed, or covered, by somewhat similar apparatus.

Other buildings which impressed Mr. Gale for their extent and elaborateness were the new public buildings at Philadelphia, Mr. MacArthur the architect, and the Mills Building in this city, Mr. George B. Post, architect. He regards the Johns Hopkins' Hospital, at Baltimore, designed by Dr. J. S. Billings, associated with Messrs. Cappett & Candler, of Boston, and Mr. J. R. Niernsée, of Baltimore, one of the most interesting structures of the kind in the world.

PERSONAL ITEMS

Dr. Paton, Smoke Inspector of Cincinnati, has been transferred to the position of Food Examiner.

General Egbert L. Viele will succeed Mr. Smith E. Lane as Park Commissioner of this city. General Viele was at one time Engineer-in-Chief of Central Park. In 1881 he prepared a report on Malaria in Western Connecticut, which is printed in the report of the State Board of Health of Connecticut for 1881.

Philadelphia Councils have elected Mr. John D. Estabrook chief commissioner of highways, bridges and sewers, in place of Mr. William Baldwin, deceased.

General Theodore G. Ellis, a well-known civil engineer, prominently identified with the proposed improvement of the navigation of the Connecticut River above Hartford, died at that city, the 9th inst., of pneumonia. For several years Gen. Ellis has had charge of the government improvements and surveys on the Connecticut River.

Governor Cleveland has appointed Mr. James Shanahan to be Superintendent of Public Works of this State, in place of Mr. Silas B. Dutcher.

The Supervisors of the town of New Lots have appointed Dr. Andrews Health Officer for the coming year.

STEAM FITTING AND STEAM HEATING.

BY "THERMUS."

No. XVII.

BOILER TRIMMINGS AND ATTACHMENTS.

(*Continued.*)

The Safety Valve.—The primary use of a safety valve on a steam generator is to relieve an excess of pressure; but aside from that, the noise it produces when steam is escaping makes it an auxiliary to the pressure gauge, by indicating that the maximum pressure has been reached, and that the immediate attention of the engineer is required, if not in the interest of safety, at least in the interest of economy.

A safety valve, to be sufficiently large, should be of such proportions that it will *let all the steam escape that the strongest fire is capable of producing when all the other outlets of the boiler are closed*, and for house boilers particularly, should the safety valve be calculated by a rule based on the *greatest* evaporation.

Engineers who have given sizes of valves for *power* boilers have not considered this question in its relation to *house* boilers, and nearly all have a different rule for the questions they do consider; with frequently very different results.

To a steam fitter who is looking for information on the subject, and who is confessedly ignorant of the aspects of the problem, this diversity must raise doubts as to the authenticity of some of the methods, and should he accept one as being the most reliable, without himself conquering the question, and being able to see it from each of the individual standpoints, he is liable to be guided by the general reputation of the writer as an engineer, and take it for granted that it is applicable to all cases, and apply it to *house-heating apparatus*.

All boilers should have ample safety valves, but with house boilers, which are automatically governed, and, as is customary, left for long periods without any one near them, the safety-valve must be the sole reliance should the self-regulating doors fail, and consequently must have proportions beyond a doubt. In ordinary practice with high pressure boilers or large boilers with flat sides (sometimes called low pressure boilers) with engineers in charge, not one in twelve will put implicit faith in their safety valve; and this only when the valve has to provide for *an excess of evaporation above the ordinary duty*. Their first impulse will be to close the draft doors, if they have any, and if not, to open the fire door, and in this they are prompted at first, as a matter of precaution, coupled, perhaps, with economy, which in time becomes a habit.

One high English authority allows 29 square inches of the circular disk of an ordinary valve, for a fifty horse power boiler. This valve is nearest to what can be purchased as a six-inch valve, and which, when we take into consideration the variations in formulæ for velocity of flow of steam through apertures, and that these velocities are based on the efflux through round holes or conoides, that the lift of the circular six-inch disk must be sufficiently great to allow an annular opening equal to ¾ of a square inch, and perhaps as great as 1⅓ square inches, for a pressure of 50 pounds above atmosphere; and, should the conclusions be correct which we draw from the experiments of Prof. Burg with a four-inch valve (*Vide* Trowbridge, "Heat Engines, and Baldwin's "Steam Heating"), we are not sure that it is possible to get an opening equal to the smallest above mentioned.

Another rule allows *one-half a square inch* of the circular disk for each square foot of grate, and though the writer is of the opinion the opening in valves should be proportional to the grate surface, the question will arise, why is not pressure taken into consideration, even assuming the half inch of the valve area to be sufficient? But is it enough? With ordinary boilers it is common to burn ten pounds of coal per hour on a square foot of grate, and should the coal

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evaporate ten times its own weight of water (not an impossible thing) there will be 100 pounds of water evaporated to a square foot of grate in an hour, which will give a 50 H. P. boiler about 30 square feet of grate and 15 inches area of valve. According to Zeuner it will take 3,000 pounds of steam about an hour and a quarter to pass through a hole with a section of one square inch when the pressure is 50 pounds. No four and one half inch valve of common construction (the nearest to 15 square inches of disk) can give such an opening and the more I consider it the more I am inclined to repeat the words of a cotemporary, that "the ordinary safety-valve is only a *danger signal*."

According to an Act of Congress, for steamboats, etc., boilers with stayed surfaces are to have 30 square inches of disk area, for every 500 square feet of *effective* heating surface, and for cylindrical boilers 24 inches of disk for the same surface. The word effective is here taken advantage of, and a rule (by what authority it is difficult to understand) that about two-thirds only of all the surfaces of marine boilers is considered effective. Thus if we add 250 to the 500 mentioned we again have what might be called a 50 horse power boiler, with 30 inches of disk or a little more than a six inch valve. The law also regulates the size of "lock up" valves at 2 inches diameter of disk for 700 feet of effective surface or less; three inches for 1,500 feet; four inches for 2,000 feet; five inches for 2,500 feet and six inches for any boiler longer. Such valves of course are not expected to do much more than *sound an alarm*.

Rules which are based on the work done in an engine cannot be applied to boilers in apartment houses and stores, in which, though the latter have engines frequently, and both have large pumps for hydraulic elevators, the steam used in the cylinders seldom represents more than one-third of the water evaporated, the remainder being for warming, cooking, washing, drying and other purposes. Again rules based on evaporation which do not take pressure into consideration must be carefully sifted, and none used that will not provide for the taking away of all the steam at all ranges of pressure. Should a valve be found upon experiment to be just sufficient to relieve a boiler at 100 pounds of steam, the same valve would not do for ten pounds maximum pressure unless it had a very much greater rise at the lower pressure. Should the openings remain the same (according to one authority the velocities being about 1,200 feet per second for the low pressure and 1,900 for the greater with *relative volumes* at 1,060 and 260 respectively*) 2½ times the weight of steam and a little over (2.57) will pass at the 100 pounds, which of course would make it necessary to have the valve give 2½ the rise, nothing else considered, for the low pressure, the evaporation being the same.

Thus if a safety valve is of such construction that it opens to the *full area of the aperture, the valve may be many times smaller than ordinary rules call for*, and that low pressures will require larger valves than high ones, but with ordinary safety valves held to their places by *leverage* or a *spring*, and necessarily of large area the result is probably different, certainly so if Prof. Burg is correct, for according to his four inch valve blowing at 12 pounds of steam, the opening or lift is $4\frac{7}{10}$ times greater that when it is blowing at 90 pounds; and consequently making a valve or *common pattern* which would be enough for the high pressure thereby sufficient for a lower one.

[To be Continued.]

In accordance with the resolution introduced by Senator Daly, and passed by the New York Senate, providing for the appointment of five citizens to examine into a plan for the increase of the water supply of this city, Mayor Edson has named the following gentlemen: Orlando B. Potter, John T. Agnew, William Dowd, Amos R. Eno, and Hugh N. Camp.

* Other and apparently more scientific authorities give a very much higher velocity for steam than the above, but I think it is better to err on the side of safety.

MALARIA.

BY GEORGE M. STERNBERG, M.D., SURGEON U. S. A.,
Late Member of the Havana "Yellow Fever Commission" of the National Board of Health, Cor. Member of the Epidemiological Society, London; F. R. M. S., etc.

No. II.

After what has been said in the preceding article it is hardly necessary to insist upon the influence of seasons and of meteorological conditions as affecting the production of malaria. But it must be remembered that owing to the number of factors the problem is somewhat complicated and that the hottest season, or the period when the most rain falls, is not necessarily the most unhealthy. For heavy rains may check the development of malaria by filling the swamps with water. Or a long continued high temperature may be inefficient either from lack of moisture—rain—or of vegetable matter subject to decomposition. The fact that the malarial fevers are more rife in autumn than in mid-summer is probably due, in part at least, to the fresh supply of vegetable matter subject to decomposition from the crop of annual plants, the leaves of deciduous trees, etc., which fall to the ground at this season and accumulate, especially in low wet places.

Moreover, the season of vigorous growth having passed, the beneficial action of living plants, which earlier in the season consumed a portion of the products of decomposition, by means of their roots and leaves, is at a minimum.

It is evident also that the amount and direction of the wind is an important consideration with reference to the dissemination of the malarial poison. This accumulates during still, muggy weather at the localities where it is produced, but it is diluted and carried away by strong currents of air. Thus an impure atmosphere may be cleansed, or a locality ordinarily healthy may have malaria brought to it through the agency of atmospheric currents.

One who would explain all of the phenomena connected with the prevalence of malarial diseases over extended areas and during a series of years, will find it necessary to consider not only the meteorological conditions noted, but the hygrometric and barometric states of the atmosphere, the amount of ozone present, etc. And, also, the physical features of the surface of the earth and the changes in the same due to the cutting away or planting of forests, to engineering operations, railroads, canals, etc.—to varied agricultural pursuits, etc. When, however, these various items are duly considered it is doubtful whether a satisfactory explanation of all the phenomena can be given. For all of the factors involved in the production of these phenomena have not yet been stated.

There is still a biological factor. Until quite recently this factor has been entirely ignored by epidemiologists, who have consequently failed, for want of sufficient data, to explain the phenomena in question. But this factor complicates the problem enormously and it remains to be seen whether future efforts, made by those who recognize the importance of this element, so long unknown to science, will be more successful than those of their predecessors who depended mainly upon meteorological data.

Modern science has demonstrated that the putrefactive decomposition of organic material is due to living micro-organisms—known under the general name of Bacteria.

The most putrescible animal or vegetable matter may be preserved indefinitely, in the presence of oxygen and under favorable conditions as to heat and moisture, without undergoing the slightest putrefactive decomposition, so long as these micro-organisms are excluded.

If then malaria results from the decomposition of organic material of vegetable origin, which can scarcely be questioned, we are justified in saying *malaria is due to micro-organisms.*

Have we then answered the question, "What is malaria?" By no means. There are many different species of bacterial organisms engaged in this work of pulling to pieces organic structures—animal and vegetable—and a variety of more or less complex chemical products are evolved during the process. As yet we are uncertain whether malaria is due to the presence of one or more of these living organisms—"germs"—in an infected atmosphere, or to that of one or more of the chemical products of vegetable decomposition, evolved as a result of their vital activity.

Perhaps both hypotheses are correct, and that poisoning may result, directly, from the respiration of an atmosphere charged with certain chemical products of vegetable decomposition; or, indirectly, from the introduction of germs which, multiplying within the body, give rise to the same poisonous products. A third hypothesis is that the germs themselves are the poison.

A complete discussion of the observed facts and experimental evidence in favor of or opposed to these several hypotheses would require far more space than has been allotted to the present series of articles. Our object will, therefore, be rather to urge the importance of further experimental research, and to indicate the direction which this should take, than to attempt to decide the question from the data at present available.

A strong argument against the supposition that malaria is a gaseous miasm is found in the fact that it is not given off from the surface of shallow ponds, ditches, etc., although these may contain an abundance of vegetable material undergoing decomposition. In water from such a source we find, however, a great quantity and variety of bacterial organisms, and there is ample evidence that malarial fevers may be contracted as the result of drinking marsh-water. Thus *Boudin* reports that "of 120 soldiers who returned from Bona to Marseilles on the ship Arago, in the year 1834, 103 were attacked with the most various forms of malarial fever, some of them pernicious, because during the voyage they drank of the marsh-water that was taken on board at Bona. On the other hand, the sailors of the same ship, who had good water, and 780 men who were embarked on two other vessels, remained well." (Hertz, in Ziemssen's Cyclopædia, vol. II., p. 586.)

The researches of Carmichael, Wernich, Miguel, Pumpelly and Smyth, and others, show that germs are not given off from a liquid containing them when this is at rest. They may be projected into the atmosphere, however, by bursting bubbles of gas. Again, the fact that the symptoms of malarial poisoning do not, usually, manifest themselves immediately after exposure to a malarious atmosphere but that the characteristic febrile attack is not developed until some time after such exposure—period of incubation—and that a first attack, or a relapse, may occur many days or even weeks after removal to a perfectly healthy locality, is hard to reconcile with the hypothesis that malaria is a non-living, chemical miasm; but it may be explained upon the supposition that the infecting agent is a living germ, capable of multiplication within the body of the infected individual.

The view, however, that this hypothetical germ finds a suitable pabulum for its development in the blood and that it is by its presence in the circulating fluid that it gives rise to the phenomena of the disease seems to the writer to be untenable for the following reasons:

(*a*) *A priori* we should hardly expect to find a germ whose normal habitat is in marshes and which develops at the expense of organic matter of vegetable origin, thriving in an animal fluid.

(*b*) But if this fluid is suited to the development of the malarial germ, how does it happen that a few germs introduced into the system, by respiring a malarial atmosphere, do not invariably multiply abundantly and produce the most serious form of malarial poisoning? In those diseases in which the blood is invaded by parasitic organisms—*e. g.*, anthrax, chicken-cholera, septicæmia in the rabbit, etc.—a small dose is as potent as a large one. For the capacity for rapid self-multiplication in a suitable culture-medium causes the result to be the same whether a small or large number of germs are introduced in the first instance. Moreover, these germ-diseases are all communicable from one animal to another and a single non-fatal attack protects from subsequent attacks. In the malarial diseases, on the other hand, the severity of the symptoms seems to correspond with the quantity of the poison introduced into the system; and one attack predisposes to another instead of protecting against it; while there is no satisfactory evidence that a person suffering from the most severe form of malarial poisoning can communicate the disease to another.

(*c*) Microscopical examination, in the writer's experience, does not sustain this hypothesis. For *in no instance have I been able to discover micro-organisms in the blood of malarial fever patients, although I have repeatedly looked for them with a first-class modern objective* (one-eighteenth inch homogeneous immersion objective of Zeiss).

It is admitted, however, that, an amœba-like organism, like that described by Laveran, might have escaped observation, as the search was directed more especially to the discovery of bacterial organisms such as the *Bacillus malariæ* of Klebs and Tommasi-Crudeli. Since the

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publication of Laveran's paper (*Comptes Rendus*, XCIII. (1881) pp. 627–'30), the writer has had no opportunity for studying, microscopically, the blood of malarial fever patients, and is therefore unwilling to express an opinion as to the value of the alleged discovery of a specific parasitic organism—the so-called *Oscillaria malariæ*—found only in the blood of those suffering from malarial poisoning. Quite recently (*Comptes Rendus*, XCIV. (1882) pp. 496–'9), M. Richard has published confirmatory observations. According to this author the parasite invades, and undergoes development in, the red corpuscles of the blood. Whether this latest discovery will bear investigation any better than those which have preceded it remains to be seen. But further confirmation is required before it can be considered *un fait établi*.

With reference to the *Bacillus-malariæ* of Klebs and Tommasi-Crudeli, we may be permitted to remark that sufficient time has elapsed since the publication of the mémoir of these gentlemen (1879) to justify us in looking for confirmation from numerous independent sources if any such organism as they obtained from malarial localities in the vicinity of Rome, cultivated in fish-gelatine solution, and injected into rabbits, is to be found in the blood of patients suffering from malarial fevers in other parts of the world.

The result of the writer's own researches, made in New Orleans during the months of September, October and November, 1880, under the direction of the National Board of Health, are given in the following extracts from his published report (Supplement No. 14, N. B. of H. Bulletin).

"Among the organisms found upon the surface of swamp-mud, near New Orleans, and in the gutters within the city limits, are some which closely resemble and, perhaps, are identical with the *Bacillus-malariæ* of Klebs and Tommasi-Crudeli; but there is no satisfactory evidence that these, or any other of the bacterial organisms found in such situations, when injected beneath the skin of a rabbit, give rise to a malarial fever corresponding with the ordinary paludal fevers to which man is subject."

"While, however, the evidence upon which Klebs and Tommasi-Crudeli have based their claim to a discovery is not satisfactory and their conclusions are shown not to be well founded, there is nothing in my researches to indicate that the so-called *Bacillus-malariæ*, or some other of the minute organisms associated with it, is not the active agent in the causation of malarial fevers in man. On the other hand there are many circumstances in favor of the hypothesis that the etiology of these fevers is connected, directly or indirectly, with the presence of these organisms or their germs in the air and water of malarial localities."

[TO BE CONTINUED.]

THE BARBER ON THE MILWAUKIE FIRE.

"Well, what's the news?" the reported asked as the German barber near the Cooper Institute tucked the towel in place.

"Vell," said the barber, "der news in der bapers und in der parber shops is all der dime choost der same. It's brincipally apoud der Irish fife days in der veek. Somedimes der golera, a murder, an election, or a high-doned sdade of affairs in der Union Glub preaks owid und Ireland gits growded by von gorner. Bud right avay it preaks owid some more alretty, and for a veek or dwo id vos all Irelant. Milvorkee growded owid der Irish dis veek. Py chimaneddy, dot vos a pig oxsidemend, aind it?

"I haf seen py a leedle down in Chermany a pig house a-fire. Drying mit oil to vill a purning lamp vos der consdidution of it. Der vlames chumped der whole house insite, und der poy ran for der purgomaster. In der old goundry you haf der purgomaster to find pegause he der key by der enchine house keebs. He vos der down oudsite by der goundry, but py und py der poy vound him. Afder dot der merchants vich to der enchine gumpany pelong vent home und put on der pig helmets und dings vich must pe worn at a fire. Negst, der machines vos py der vire tragged alretty, und der peeple vent und got owid der pig vorter parrels on veels, but der sdreeds vos so rough der vorter bretty near all sbilled owid. Py dot dime der house vos purned down, und efferypoddy had so much drouble for nodding.

"Vell, you dink dot was breddy pad, aind it? My goot vrend, id vos more pedher for human life in der olt gundry than it peen py Nye Yorick. Der beeple tond got such a graze for insurance ofer dere, und fires aind so gommon. Der pilders must go to chail choosd like der rest ov der scountrels if dem dry to make insurance dake der blace ov bricks und mordar. Here, mit a leedle money und a pig morkage der valls go up, und der garpenders und masons keep guied und spik in a visper for fear der house vill pefore it vos finished fall down. Afder dot it is vell insured, und in den years der lantlort says, 'I haf got dwice owid of it vot it gost, und it is olt-fashioned now. I vood not purn it town, put it vood pe a bartickler vavor if Broffidence vill set fire to it.'

"Ven a man has such a vaith in Broffidence like dot he can zet fire to mountains.

"Insurance is doo much of a goot dings. Don't you dink if ve coot vix it so dot any man vot got der tirlirium chim-chams should come owid richer then he vent in dot der chim-chams vood pe right away more gommon alretty?—*The New York Sun.*

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Jan. 13.....	24.25	17.24	20.46	24.53	29.35	19.05

E. G. LOVE, Ph.D., *Gas Examiner.*

INCANDESCENT ELECTRIC LIGHTING.

JERSEY CITY, *Jan.* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

Now that the Edison Electric Light Company have given their prices for incandescent lighting, it becomes a very simple problem to determine the relative value for illumination by the incandescent light and gas.

Take their price for incandescent lighting at one dollar for one thousand candle-power, burning one hour, and gas at the rate of $2.25 per thousand cubic feet, we have the following results; to illustrate which, I will take the statement of the correspondent of THE SANITARY ENGINEER, Jan. 4, wherein he gives the bill rendered E. P. Coby & Co. for incandescent lighting, as 13,264 candles at $1 per 1,000 candles =$13.26 It is a well-known fact that the gas furnished by the Mutual Gas Light Co. is equal to 25 candle-power—*i. e.*, a burner consuming five cubic feet per hour gives a light equal to 25 candles or one cubic feet of gas equals five candles; it follows, therefore, that 2,653 cubic feet of gas would be equal to 13,264 candles by the incandescent light.

The account would stand thus:

13,264 incandescent candles at $1 per thousand.....	$13.26
2,653 cubic feet of gas at $2.25 " ".....	5.96
Saving by using gas.....	$7.30

Having discussed the economy of incandescent lighting and gas, let us look for the merits of the arc light, compared with gas.

While the writer believes that the arc can be used with great economy, in the lighting of public parks and large areas, where the whole power of the light is utilized, he knows that for street lighting gas has the advantage over the arc light; in the arc light there is so much of the light intercepted by buildings, and to subdivide this light would make its cost almost equal to the incandescent light: a great blaze of light at one point is not necessary nor is it pleasant; the great desideratum in street lighting is to have them uniformly lighted. CANDIDUS.

ELECTRIC LIGHT NOTES.

A Canadian company, under the title of the Canadian Electric Light Company, will compete for the lighting of Montreal.

In reply to a communication from the Fire Commissioners of Cincinnati, with reference to the dangers of electric light wires to firemen, the Brush Company have appointed a committee of conference to meet the commissioners.

At Bradford, England, the corporation applying for a provisional order to light the borough, propose to charge for the electric light a price equivalent to $1.50 per 1,000 cubic feet of gas. This is said to be double the price at which gas is now supplied.

The electric lighting of Rochester, N. Y., has now progressed to the lighting of Main street, which is brilliantly illuminated, according to the local papers, by the lamps.

The Brush Co. has challenged the United States Electric Light Co. to a public test of their systems, in Louisville, Ky. The loser is to pay $1,000 toward the expenses of the exhibition and $4,000 to the Polytechnic Society of Kentucky.

The Savannah, Ga., Board of Aldermen, the 7th inst. authorized the Brush Electric Light and Power Company to erect masts and towers in accordance with their contract for lighting the city.

A dispatch from Cleveland, O., states that the city is discussing the abandonment of the electric light on account of its cost. More light is given, but at a higher price. On Euclid Avenue eight mast Brush lights, costing $13,200 per annum, have replaced 75 gas lamps costing $3,300.

The Chamber of Commerce, of Milwaukee, immediately after the fire at the Newhall House, addressed a letter to the Mayor requesting him to take steps to bring a petition before the State Legislature and City Council for legislation compelling telegraph companies to put their wires underground in the business centre of the city. They claim that the obstruction of the wires to the firemen caused increased loss of life.

Meter-ites.

In connection with the Marine and Mechanical Exhibition, to be opened in London next July, there will be an exhibition of apparatus illustrative of gas, water, electric, and telegraph engineering.

The negotiations for the amalgamation of the Gas Light and Coke and the London Companies has fallen through. The chief difficulty was the division of the London Company's district between the Chartered and South Metropolitan Companies.

The Hartford Steam Company is seeking such an amendment of its charter as will permit the manufacture of gas of cheap grades, for heating purposes. We have before noticed other cases in which steam companies in different cities of the Union are seeking to obtain authority to supply gas.

Mr. W. Foster, in an article in the *Journal of Gas Lighting*, on the production of ammonia in gas manufacture, gives the total amount of nitrogen in coal as 1.73 per cent. Of this amount, 16 per cent. is evolved as ammonia and cyanogen in gas manufacture, 50 per cent. remains in the coke, and the balance is unaccounted for.

The report of the Superintendent of Lamps of the City of Boston for the year 1882 shows that there were at the close of that year 12,967 oil, gas and electric lamps, in different sections of the city, an increase of 71 over the preceding year. The gas lamps, owing to the introduction of the electric light, show a falling off of 149. The electric lights of the Brush Company were introduced in February, 1882, and there are now 59 of 2,000 candle power each in use, for which the city pays 65 cents per lamp per night. These lights have given satisfaction. In May the city entered into a contract with the New Eng'and Weston Electric Light Company, so now has 57 lamps of 2 000 candle power, for which it pays 58 cents per lamp per night. These have not, however, been satisfactory, which the Superintendent attributes to want of proper care and management. A table of prices paid for gas since 1875 is given, from which it appears that the city proper paid in 1875 $2 08½ per 1,000 cubic feet; in 1882 $1 50; prices in the other districts ranged from $2 50 to $3 00 in 1875, to $1 87½ to $2 25 in 1882. To private consumers the price now ranges from $1 80 (the Boston Gas Light Company) to $3 00 (the Jamaica Plain Gas Light Company.)

EXPLOSION OF A STEAM TABLE.

This morning about quarter past seven, a singular accident occurred in the kitchen at the Lochiel Hotel. One of the adjuncts of the kitchen is a long table, the top of which is hollow and contains spaces on which dishes of meat, etc., are placed to keep them warm. The table is heated with steam, which is forced through it from the engine and escapes at one end. This morning the escape was shut off by some means entirely inexplicable, and the steam was forced into the table until it could hold no more, in consequence of which there was an explosion, accompained by a loud report. The seams of the table were forced open, the legs twisted and bent and the whole room filled with steam. Dishes were thrown into the air, and things were scattered about promiscuously, but fortunately no one was near enough to be injured. The damage was instantly repaired, and things moved along smoothly in a short time.—*Harrisburgh Telegram, Dec.* 13.

[Improvised steam tables are generally unsafe. All steam tables have large flat surfaces, which we believe to be seldom braced or stayed, the stiffness of the metal of the top and bottom being depended on, reinforced, perhaps, by a rib. No engineer will construct a water leg or any other flat surface for a boiler, say 30" by 60" and not brace it, and yet they will rig up the most flimsy contrivances for purposes such as above.—ED. SAN. ENG.]

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Food and Drugs.

BOARDING HOUSES AND THE ADULTERATION LAW.

To the Editor of THE SANITARY ENGINEER:

Your paper of Jan. 4, 1883, has been handed to me; I am pleased to see that in it you advocate pure air, also pure food and drink, so essential to health. Your kindness in answering the question from a grocer as to the standard of pure cream tartar induces me to ask you if the hotels, restaurants and boarding house keepers can be punished for using adulterated articles of food, etc. After reading the reports from the different chemists, stating the various articles found in adulterated spices, especially pepper and mustard, I made up my mind to sell nothing but pure goods. Of course I had to pay and sell at a higher price than when I sold impure goods. I had trade with hotels, restaurants, and boarding houses who complain that the price I ask for pepper, for instance, is so much more than they can buy at other stores. I do not now sell them. That you may see I do not ask an exorbitant profit, I give 23 cts. per lb. for my pepper and sell it at 28 cts. per lb.; for mustard I pay 30 cts. per lb. and sell at 40 cts. per lb., which I think is as small a margin of profit as I can live upon and pay 100 cents to the dollar. Now, Sir, why should not the hotels, restaurants, and boarding houses be compelled to give to their customers pure spices, mustard, etc., as well as the grocers who sell direct to the public?

Your answer will oblige another GROCER.

[We believe that hotel or restaurant keepers who furnish their guests with adulterated articles of food are liable under the law, and if prosecuted, we think the courts would so decide. The policy of, at this time, enforcing the law in that direction is a matter for the State Board of Health to decide upon. We should consider that more could be gained in other ways.]

IMPORTATION OF INFERIOR TEAS.

We have received the following communication, petition and bill to secure legislation to prevent importation of inferior teas;

It is asserted that since England has prohibited the importation of unsound tea for home consumption, the United States is used as the only dumping ground for it.

In the year 1880, 36,195 packages were forbidden to be cleared for home use in England, and 6,225 packages were condemned as unfit for food. In the year 1881, 44,443 packages were forbidden to be entered for consumption in England, but was allowed to be exported, part of which found its way to America.

As the differential duty will cease on the first of January, 1883, undoubtedly more if not all of this rubbish will be sent to America.

This tea is now principally sent here on English account from China, and sales to dealers by private contract is almost impossible.

The unsound tea is forced into the country by public auctions, and under various disguises palmed off on the poorer and working classes.

Legislation only can give them relief.

To the Honorable, the House of Representatives:

We, the undersigned dealers in tea, respectfully petition your honorable body to relieve us from a grievance which has become too serious to be borne.

Several years since, England enacted a law prohibiting the importation of all adulterated teas. This embraced all teas of inferior grades whose chemical properties are injurious to public health. Now, the markets of the United States are overstocked with this refuse and tea dregs from China and Japan.

The yearly importation of tea is about eighty million pounds; of this quantity fully twenty per cent. is too inferior for healthy consumption, objectionable in every sense.

The yearly consumption of tea in the United States is about sixty-five million pounds. With the exclusion of the adulterated stock there would be sufficient good tea to supply the needs of the people, and a healthy action would result.

We ask for the enactment of laws prohibiting the importation of adulterated teas.

As a sanitary measure it demands attention, and will repay the little expense entailed by the appointment of sanitary inspectors.

For relief from this burden your petitioners will ever pray.

NEW YORK, *Dec.* 18, 1882.

A. A. Low & Bros., 31 Burling Slip.
John Caswell & Co., 87 Front St.
Hewlett & Torrance, 67 Wall St.
Carter, Hawley & Co., 106 Water St.
Mosle Bros., 52 Exchange St.
Busk & Jerous, 41 Water St.
Geo. A. Morewood & Co., 34 South St.
Howland & Aspinwall, 545 South St.
Wm. McGregor, 119 Front St.
John H. Catherwood & Co., 94 Front St.
E. W. Corlies, 66½ Pine St.
W. A. Milton & Co., 159 Maiden Lane.
Geo. W. Lane & Co., 93 Front St.
Recknagle & Co., 45 Beaver St.
Swire Bros., A. H. Gibbs, Agt., 93 Wall St.
D. H. Houghtaling & Co., 142 Front St.
DeGroot & Peck, 124 Water St.
H. W. Banks & Co., 109 & 111 Wall St.
Henry Sheldon & Co., 109 Front St.
Thos. T. Barr & Co., 107 Front St.
George C. Chase & Co., 105 Front St.
Dorman, Collins & Co., 96 Front St.
J. C. Runkle & Co., 130 Front St.
Raymond & Ayer, 104 Front St.
Cassidy & Co., 135 Front St.
H. & G. B. Farrington & Co., 149 & 151 Front St.
Isaac Newlin, 141 Front St.
Joseph J. O'Donohue, 101 Front St.
Billings & Wetmore, 103 Water St.
Fred'k Mead & Co., 104 Water St.
Flint, Boardman & Nash, 112 Water St.
H. K. & F. B. Thurber, 116 Reade St.
Francis H. Leggett & Co., 128 Franklin St.
S. Burkhalter, & Co., Hudson & Leonard St.
H. H. Palmer & Co., 339 Washington St.
B. Fischer & Co., 325 & 327 Greenwich St.
N. Millard & Co., 172 Duane St.
Bessen & Van Olinda. 150 Chambers St.
H. Van Nostrand & Co., 307 Greenwich St.
Fitzpatrick & Case, 80 Front St.
Austin, Nichols & Co., 61 Hudson St.
Wm. P. Roome & Co., 96 Water St.
Paxon Vicker's Sons, 130½ Water St.
M. F. Powers, 100 Water St.
Reeve, Osborn & Co., 97 & 99 Water St.
Payne & Storm, 133 Front St.
Clark, Holley & Ketchum, 90 & 92 Front St.
Huntington & Dorn, 106 Front St.
Hard & Rand, 107 Wall St.
Merritt & Ronaldson, 93 Pearl St.
Apgar & Co., 73 Dey St.
Baker, Sanford & Co., 75 Dey St.
London & Johnson, 181 Chambers St.
E. C. Hazard & Co., 192 & 198 Chambers St.
Lewis DeGroff & Son, 47 Harrison St.
A. Halliday & Co., 17 Harrison St.
Mohlman & Eggres, 339 Greenwich St.
John Emmans & Co., 93 Water St.
Thos. Rutter & Co., 96 Front St.
Benj. Odell & Bro., 80 Vesey St.
Carpenter Cornell & Co., 41 Jay St.
S. F. & E. J. Knapp & Co., 202 West St.
Stephen Moorhouse & Co., 150 Duane St.
Beebee & Bros., 104 Wall St.
J. & J. R Montgomery & Co., 127 & 129 Water St.
Atwood, Lester, Cary & Co, 95 Wall St.

A BILL

TO PREVENT THE IMPORTATION OF ADULTERATED TEAS.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That from and after the first day of July, eighteen hundred and eighty three, it shall be unlawful for any person or persons, or corporation, to import or bring into the United States, for the purpose of sale, any adulterated tea; and the same is hereby prohibited.

SEC. 2. That all tea, or other substance under the name of tea, imported from abroad, shall, before passing the custom-house, be examined and appraised, as well in reference to its quality and purity, as to its value and indentity specified in the invoice.

SEC. 3. That if, on examination, any tea is found, in the opinion of the examiner, to be adulterated, or so far affected by chemicals as to be unfit and dangerous for use, a return to that effect shall be made upon the invoice; and the tea, or article called tea, so noted shall not pass the custom-house, unless, on a re-examination, called for by the owner or consignee, the return of the examiner shall be found erroneous.

SEC. 4. That if upon such re-examination the tea shall be found to be adulterated, it shall remain in charge of the collector, and the owner or consignee, on payment of the charges of storage and other expenses necessarily incurred by the United States, and on giving a bond, with sureties satisfactory to the collector, to land the said tea, or article called tea, out of the limits of the United States, shall have the privilege of re-exporting the same at any time within the period of six months after such re-examination; but if the same shall not be sent out of the United States within the time specified, the collector, at the expiration of that time, shall cause the same to be destroyed, and hold the owner or consignee responsible to the United States for the payment of all charges, in the same manner as if the said tea had been re-exported.

SEC. 5. The examination and appraisement herein provided for shall be done by an appraiser of the port to which said tea is entered, and when entered at ports where there are no appraisers, such examination and appraisement shall be made by the revenue officers, to whom is committed the estimating and collection of duties, unless the Secretary of the Treasury shall otherwise direct.

"Herr Richter very tersely informed Bismarck, the other day, that the prohibition of the importation of American pork was much less a sanitary than a protectionists' measure."—*Savannah News.*

In compliance with the recommendation of Gen. Thayer, Superintendent of Fairmount Park, two tug boats have been put to work breaking the ice on the Schuylkill river, above the Fairmount Water Works dam, to keep the river channel open to allow the air to purify the water. As soon as the ice on the sides of the river is sufficiently thick it will be cut and removed by the Knickerbocker Ice Co.

THE McCLOSKEY TRAP VENTILATING PATENT SUIT.

In the following abstract from the records in the McCloskey patent suit we have given the testimony only of those witnesses whose evidence proved that the feature patented by Mr. McCloskey had been in actual use in buildings in the United States two years prior to the filing of his application for a patent.

The other evidence submitted, while in our opinion sufficient to invalidate the patent, yet gave hope to the plaintiffs because it was claimed that the recommendations and illustrations in THE SANITARY ENGINEER, the Massachusetts State Board of Health Report, and other publications that appeared prior to his application for a patent did not amount to proof of actual use in the United States, but were of the nature of recommendations, and that unless the system could be found in actual use in houses two years prior there was no evidence that the American public had adopted the advice contained in the published suggestions and had made such use of the idea as the law contemplated. To avoid the delays and expense of introducing English evidence that McCloskey was not the first inventor, efforts were made to ascertain instances of the two years' prior use in this country, which evidence could not be procured in this city. Boston and San Francisco, however, were able to supply it. Want of space, therefore, will oblige us to limit our quotations to the testimony of the witnesses from these cities and to the illustrations they submitted in evidence.

It is but just to state that Messrs. E. S. Philbrick, James A. Tucker and Isaac Riley of Boston, and George Milne of San Francisco, whose testimony will be found below, voluntarily gave much time to this case at considerable personal inconvenience, and we desire to acknowledge our indebtedness to them therefor.

CIRCUIT COURT OF THE UNITED STATES,

SOUTHERN DISTRICT OF NEW YORK.

[IN EQUITY.]

JOHN MCCLOSKEY
vs.
JAMES H. YOUNG.

Proofs for final hearing taken on the part of the defendant, under and pursuant to the 67th Rule in Equity, before Joseph Gutman, Jr., Examiner.

NEW YORK, *June* 3, 1881—11½ A. M.

Present—C. WYLLYS BETTS, ESQ., counsel for defendant.

EDWARD S. PHILBRICK, a witness of lawful age, produced on the part of the defendant, having been by me first duly cautioned and sworn to testify the truth the whole truth and nothing but the truth in the matter of controversy herein, and being examined by Mr. Betts, deposes and says:

1 *Q.* What is your name, age, residence and occupation?

A. My name is Edward S. Philbrick; I am 53 years old; I reside at Brookline, Mass.; I am a civil engineer.

2 *Q.* Are you acquainted with the system or systems of draining houses by the use of traps and other matters connected with drainage, and if so, for how many years have you been familiar with it?

A. I have been familiar with it all my life, and have made a special study of it the last six years.

3 *Q.* Did you ever see any traps connected with basins or water closets which were ventilated in any manner; if so, please state when you were so familiar, and describe such trap or traps?

A. In the year 1875 I built two houses in Brookline, Mass., where I applied a ventilating pipe to the trap receiving wash bowl wastes, above which water closets were connected to the same main soil pipe.

4 *Q.* Please describe the system of ventilating these traps as employed by you in these two houses in Brookline in the year 1875, and illustrate the same by any drawing you can produce.

A. The vent pipe above referred to was attached to the top or outlet of the trap beneath the floor, and extended across the adjacent room under the floor to a special flue constructed in the chimney, through which it communicated to the open air above the roof. The soil pipe had another opening to receive air by an air valve, which opened inward only near the water closet. This is described by a drawing which I produce, marked Exhibit

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Philbrick 1,* in which the pipe marked "vent pipe" is the ventilation pipe above referred, and the valve is marked "air valve."

5. *Q.* What was the size of that ventilation pipe leading from the soil pipe to the flue?

A. Either an inch and a quarter or an inch and a half; I don't remember which.

6 *Q.* How do you know that it was in the year 1875 that this ventilation pipe was so used by you?

A. I remember seeing it put in; I superintended the work myself.

7 *Q.* Is there any circumstance by which you can definitely determine that it was prior to the year 1876?

A. Yes; I know I leased the house for five years, beginning Nov. 1, 1875, and that I renewed the lease last November, after its expiration. The house was completed before Nov. 1, 1875, when the occupation began.

8 *Q.* What was the character of the use of this trap, as to whether it was public or private?

A. There was no secrecy about it. The specifications requiring it were submitted for competition to competitive bidders. The same practice had been in use in England previously.

9 *Q.* When did you next see a ventilated trap, and what was its use, and where was it?

A. The next case, of which I have definite record, was at the house of Dwight Foster, in Boston, No. 18 Chestnut street, where I was employed by the proprietor to execute certain improvements. I there applied ventilating pipes to several traps on different stories or floors, combining them into one pipe, which entered to the soil pipe under the roof, essentially as shown in the drawing Exhibit Philbrick 2. I did this work through Messrs. Hawthorn & Tucker, plumbers, of Boston. This work was done in September, 1876, as I find by reference to my diary.

10 *Q.* Please describe the character and material and uses of each of the parts of the traps, soil pipes and other connections which you placed in the house of Dwight Foster, in September, 1876, referring to the drawing Philbrick 2.

A. These ventilating pipes were of lead, from an inch to an inch and a half diameter inside; they were attached to the traps at their outlets, just below the water seal—that is, attached to the top of the arch of the traps on the side next the soil pipe, as the water flange furthest from the basin or closet. They served to supply the normal atmospheric pressure to each trap by their communication with the atmosphere above, and thus prevented the risk of the traps being syphoned and losing their water seal when in use by a partial vacuum which might otherwise be created at those points. If so syphoned, the sewer gas would gain admission immediately to the house. It also answered as a vent or means of escape for any bad gas which might accumulate in the outlets of these traps.

This arrangement was affected by a lead ventilation pipe, separate from the soil pipe, connected by branches to each of several traps and connecting with the soil pipe above the highest point where drainage was admitted into it; as marked in the drawing Philbrick 2, by the words "ventilation pipe."

11 *Q.* What was the character of the use of these traps with the ventilating pipes connected as described?

A. No attempt at secrecy and no thought of secrecy was entertained. I considered it a matter of public practice.

12. *Q.* What was your next knowledge of the use of ventilated traps—give the date and place where used, and describe the same with reference to any drawing you may have, or other description?

A. In the autumn of 1876 I built a house at the corner of Walley and Irving streets, Brookline, Mass., which I still own. The drawings and specifications were prepared in my own office, by myself, and I superintended the construction personally. The specifications and drawings were submitted to competition. I have here with me the original copy of the specification, from which I read as follows: "In the bath room the wastes from the bowl and tub shall each have a separate cast lead S-trap directly below, made easy of access and provided with a vent branching into soil pipe above." I remember seeing the work done exactly as above described. This is found on page 30 of the specifications.

On page 31 as follows:

"The soil pipes to be of cast iron, four inches diameter, with caulked lead joints, from the outside of the cellar to and through roof and for about two feet above the roof, where its open end is to turn down." I remember seeing the sink constructed as above, except that the extension of the soil pipe was made above its upper inlet, for drainage, of two inches diameter instead of four.

On page 33:

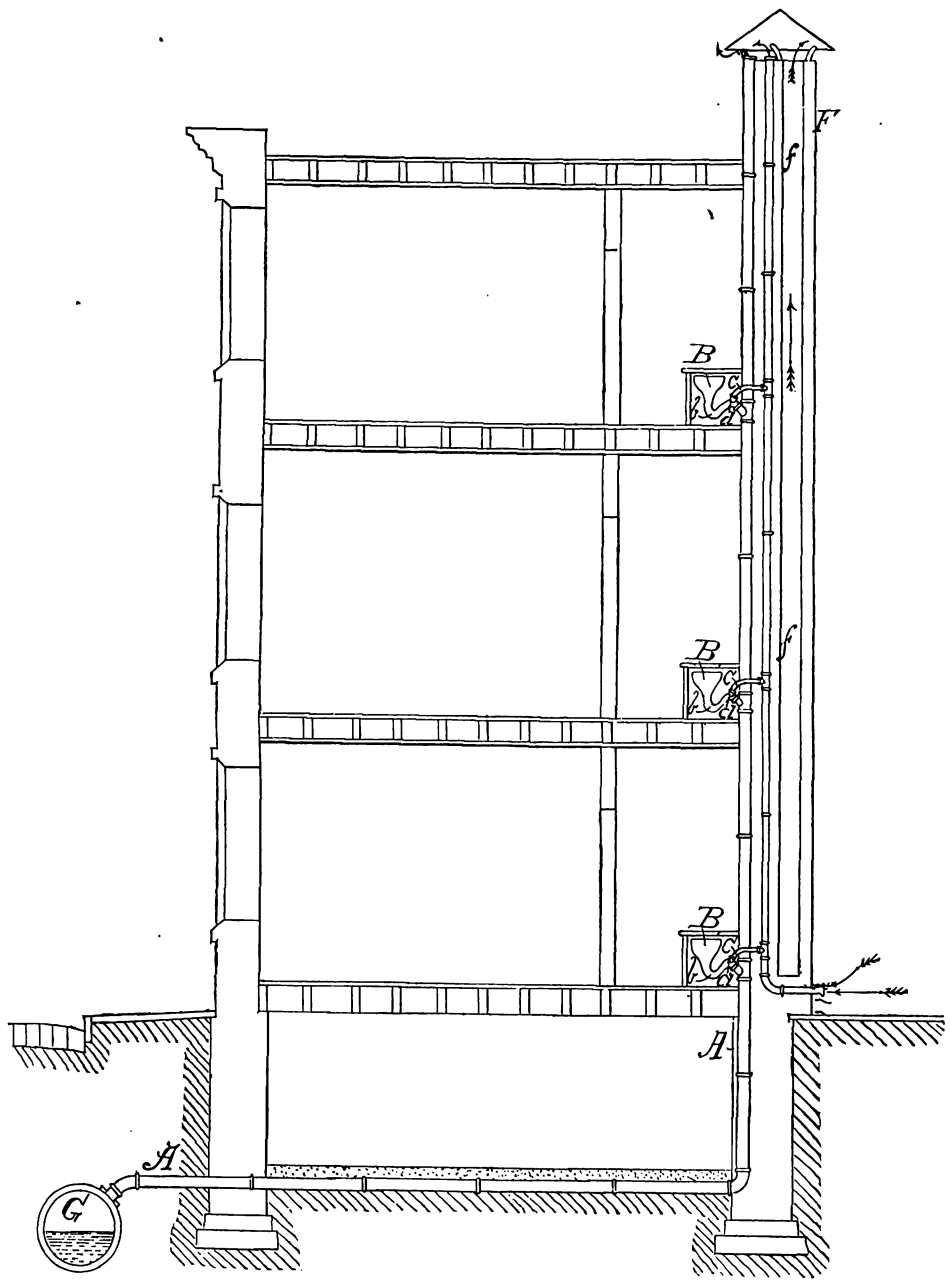
"The waste pipe from kitchen sink shall have a vent of one-inch lead pipe from the top of the air space in its trap connecting with a two-inch pipe through the roof." I remember seeing this constructed as above specified, except

COMPLAINANT'S EXHIBIT I.

J. McCLOSKEY.

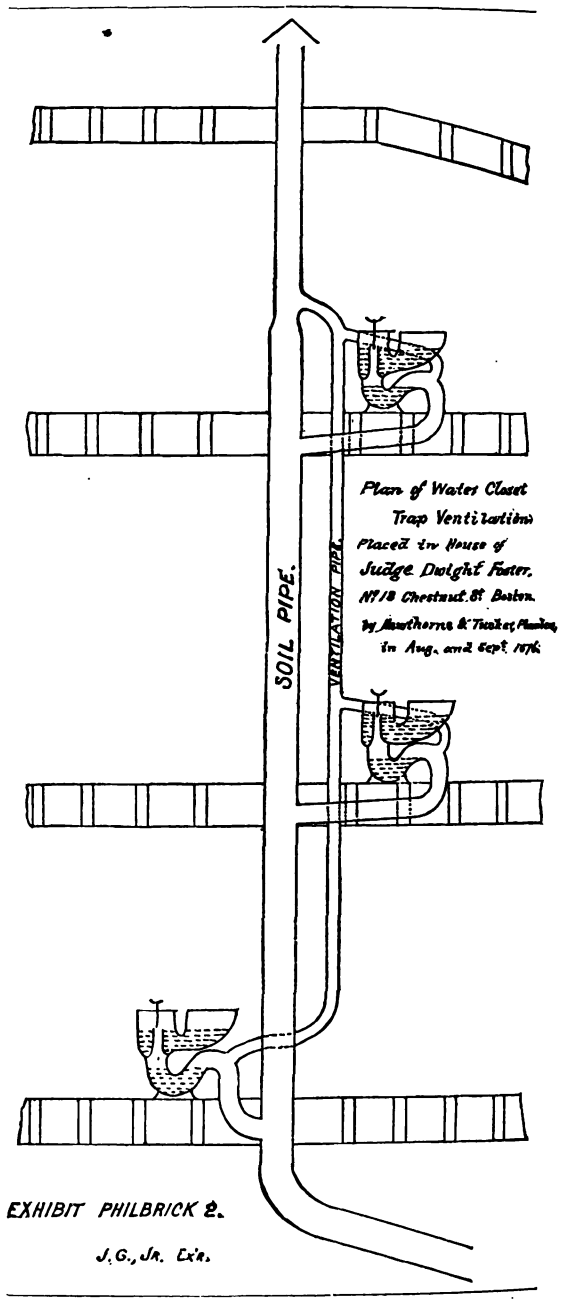
SEWER-PIPE CONNECTION, &c.

No. 218,891. Patented Aug. 26, 1879.



WITNESSES:
Henry Eichling.
Charly Albreckt.

INVENTOR:
John McCloskey.



* This exhibit, showing ventilation of a single trap, we have omitted.

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that instead of passing through the roof independently, the vent pipe was branched into the extension of the soil pipe above the bath room floor.

The above work was all provided for in the contract and performed by Messrs. Hawthorn & Tucker, for the sum of $375, in connection with other contract work. In addition to this, a sink was constructed in the china closet, or butler's pantry, with a special trap directly under it. A ventilation pipe, one inch diameter, extended from the top of this trap to the similiar vent which served the trap of the wash bowl in the bath room, on the floor above, referred to in the first quotation from the specifications.

The traps, vent pipes, and fixtures, as described above and as constructed, are shown on a drawing which I produce, marked Exhibit Philbrick 3.

Defendant's counsel offers in evidence the three drawings produced, referred to as Exhibits Philbrick 1, 2, and 3, and also the original specification from which the above extracts were read, and which is marked Exhibit Philbrick Specification.

A. As far as I can understand the model, the arrangement and connection of pipes for ventilation of pipes, etc., is essentially similar in this model and in the two houses referred to. It differs only in the relative position of the traps to each other, which is accidental in each case.

16 *Q.* Have you ever published any account of ventilated traps in connection with house drainage; if so, please state when and where?

A. I wrote a paper for the Massachusetts State Board of Health in 1875, which was published in January, 1876, in their Annual Report to the Legislature of the State. In that paper, on pp. 452, 453 of the State Report, I described the propriety of an arrangement substantially similar to that which I applied in the houses described above, and illustrated it with a diagram contained in said Report facing page 453.

The State Report referred to by the witness is offered in evidence and marked Exhibit Annual Report, 1876.

17 *Q.* Please look at the Letters Patent granted to J. McCloskey, August 26, 1879, No. 218, 891, for improvement in sewer pipe connections, and state whether you are familiar with the same, and if so, please compare the same with the system of traps, ventilation pipes and soil pipe described in your previous testimony and in the report of the State Board of Health for 1876, and give the reasons for any opinion you may express.

A. I have examined the Letters Patent referred to several times. I have never been able to discover in it any point or combination which I have not previously practiced in the instances above described, except the extension of the gas or vent pipe marked *C* to the open air near the foundation of the house, and for that I see no practical use or advantage.

The combination of vent pipes with the traps communicating with the open air above, through the soil pipe or otherwise, as described in the patent referred to, is precisely similar in all its essential features to the construction in the houses I described above, as used by me in the year 1876, and recommended in my paper, published by the State Board of Health above referred to.

18 *Q.* Have you any interest in this controversy?

A. None, as between the plaintiff and defendant, whatever.

19 *Q.* Was the use in the ventilated traps in the houses described by you in any sense experimental?

A. I did not consider it so. I felt very sure of its operation, as governed by well-known physical laws, before applying it to the first house, in 1875, and the results were entirely successful. The apparatus above described was in each case built in a permanent form, and is still remaining in those houses unchanged.

20 *Q.* Was the use of these ventilating pipes in connection with the traps and soil pipes, as above described, in any sense private?

A. It was not; they were all used in the most public manner possible, considering that they were used in private houses.

EDW'D S. PHILBRICK.

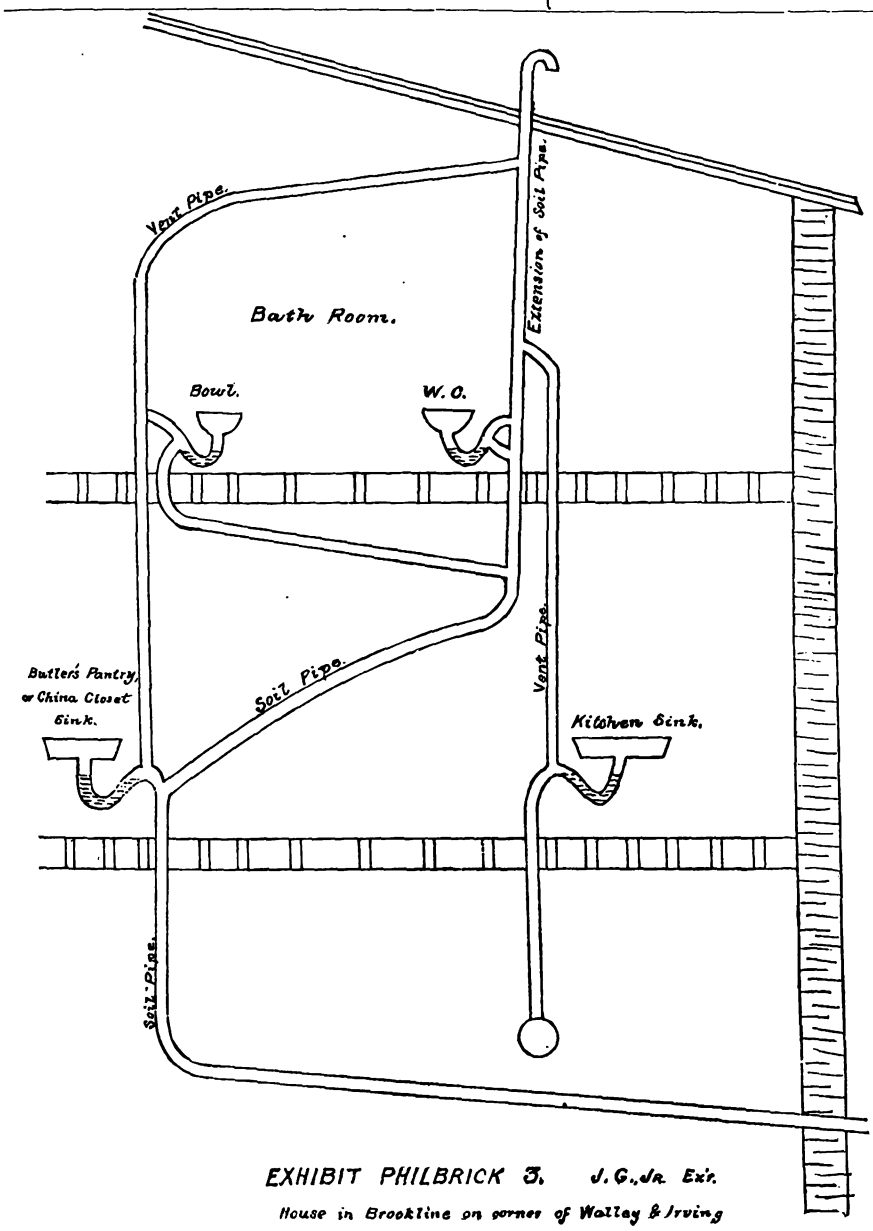
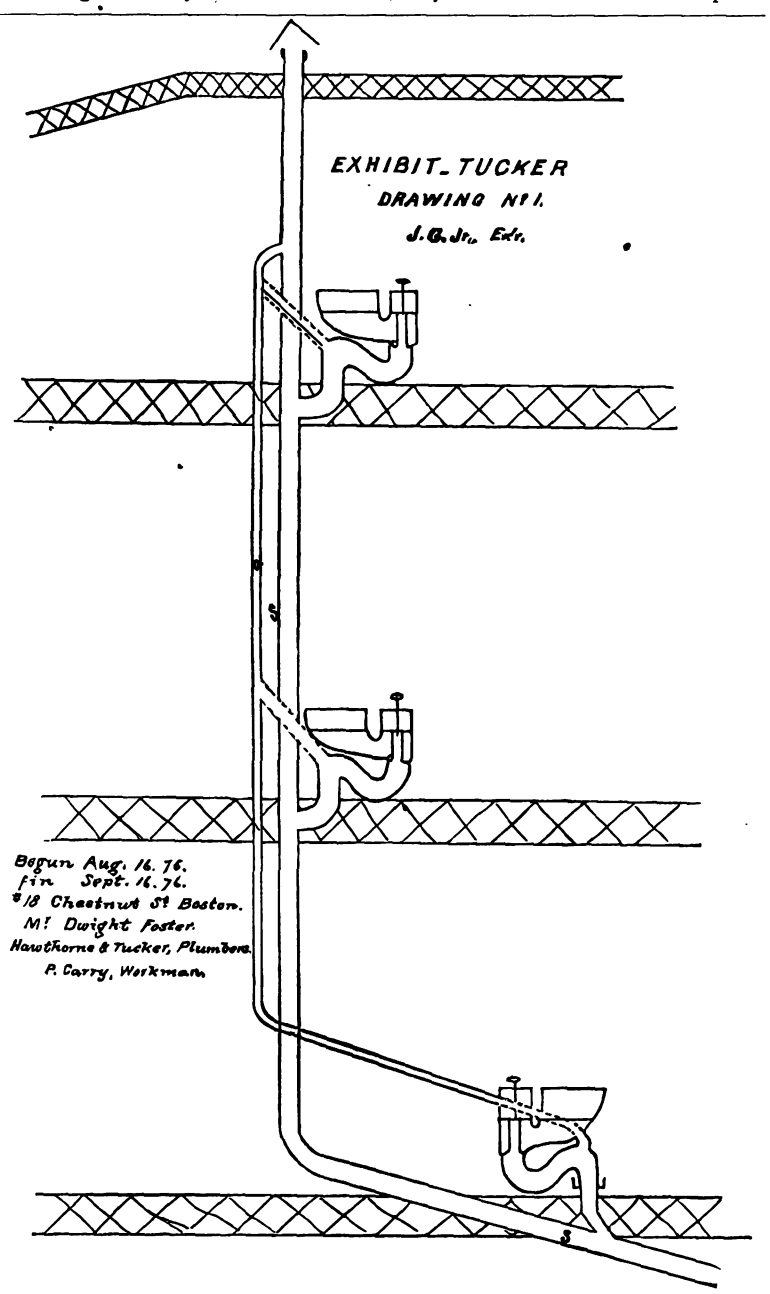


EXHIBIT PHILBRICK 3. J. G., JR. Ex'r.
House in Brookline on corner of Walley & Irving Sts, built 1876.



Sworn to before me,

JOSEPH GUTMAN, JR.,
Examiner.

NEW YORK, *June* 6, 1881—10:30 A. M.

Present—F. H. BETTS, ESQ., counsel for defendant.

JAMES TUCKER, a witness of lawful age, produced on the part of the defendant, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy herein, and being examined by Mr. Betts, says:

1 *Q.* What is your name, age, residence, and occupation?

A. My name is James Tucker; I am 45 years old; I reside at Boston, Mass.; I am a plumber.

13 *Q.* When was this work, described in your last answer, commenced and when completed, and how do you fix the date?

A. It was commenced November 15, 1876, and finished February 3, 1877, and paid for February 8, 1877, as I find by the bill which I produce.

Bill referred to offered in evidence, and marked Exhibit Hawthorn & Tucker's Bill.

14 *Q.* What were the uses of the ventilating pipes connecting the traps with the soil pipe, as above described?

A. The same as described in my answer to question 10.

15 *Q.* Look at the model marked in this case, Complainant's Exhibit No. 2, R. T. Van Boskerck, and compare it with the system of traps and ventilation which you have described as existing in the year 1876, in the house of Mr. Foster, and as completed February 3, 1877, in your own house.

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2 *Q.* How long have you been a plumber?

A. Since April, 1860; a portion of the time I was absent in the army—four years and six months.

3 *Q.* How old were you when you went into the plumbing business?

A. Not quite fourteen years old.

4 *Q.* Have you been a member of any firm in your business, and if so, what?

A. In 1868 I was a member of the firm of Wilson & Tucker; in 1872 I was of the firm of Hawthorn & Tucker; in 1881 Tucker & Titus, which is in existence now.

Recess taken till 11:30 A.M., to enable counsel to attend the opening of the United States Circuit Court.

11:30 A.M.—same day.

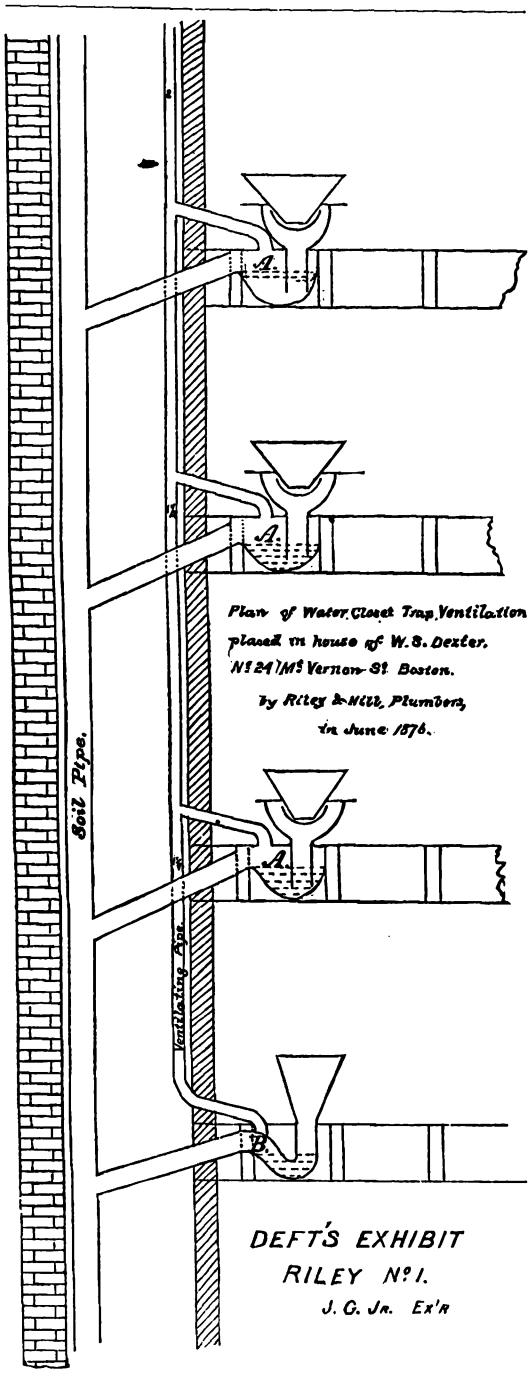
Present—Counsel as before.

5 *Q.* Did you ever do any work as plumber under direction of Mr. E. S. Philbrick, of Boston?

A. Yes, sir.

6 *Q.* Please state some of the places in which you put plumbing work under the direction of Mr. Philbrick?

A. In Judge Dwight Foster's house in Chestnut street—No. 18 or 16, I forget which—and in his own house, Mr. Philbrick's own house in Brookline, Mass.



7 *Q.* State when you did the said plumbing work to Judge Dwight Foster's house?

A. I commenced the job August 16, 1876, and finished it on September 16, 1876.

8 *Q.* When did you do the work for Mr. Philbrick in the Brookline house?

A. I commenced November 15, 1876, and finished February 3, 1877.

9 *Q.* Please describe the character and construction of the plumbing work which you put into Judge Foster's house in August and September, 1876?

A. There were three water closets in the house and one stack of soil pipe; this main stack was run out through the roof, from the lower closets, first story; from the outside of the lower trap an air pipe was connected with the soil pipe above the upper closet, receiving in its passage air pipes from the other two closets,

10 *Q.* Have you here a drawing showing the arrangements of plumbing connected with said water closets in said house, if so please produce it.

A. Yes, sir.

Witness produces a drawing, which is offered in evidence, marked Exhibit Tucker Drawing, No. 1.

11 *Q.* Please mark the soil pipe in said drawing with the letter S,

The witness does so.

12 *Q.* Please mark the air pipe which you have referred to with the letter *a*.

The witness does so.

13 *Q.* Please mark the air pipes from the two upper closets which connect with the first named air pipe with the letters *a' a'*.

The witness does so.

14 *Q.* What was the object and purpose of using the pipe *a* and connections *a' a'*?

A. To prevent the entry of sewer or foul air through the fixtures—through the closets—into the house.

15 *Q.* From what portion of the traps of the several closets did these air pipes *a* and *a' a'* run?

A. From the outside of the traps; I mean on the other side between the water and the sewer.

16 *Q.* Is the point of connection of the air pipes *a* and *a' a'* correctly shown in the drawing Exhibit Tucker Drawing?

A. Yes, sir.

17 *Q.* Do you know how long the construction and system of plumbing in Judge Foster's house, as shown in Exhibit Tucker Drawing No. 1, continued in use?

A. Until the present time, until I left Boston on Sunday last; from 1876 to that time.

18 *Q.* How lately have you examined it?

A. I made this drawing on the premises (Exhibit Tucker Drawing 1) within six months.

19 *Q.* State how the said system and construction of plumbing has operated in said house with reference to the exclusion of sewer gas?

A. It has been a success.

20 *Q.* Please examine the drawing marked Exhibit Philbrick No. 2 and state if that correctly represents the same construction and system of plumbing, viewed from a different side, as that represented by your drawing?

A. Substantially.

21 *Q.* Please describe the construction of plumbing placed by you in Mr. E. S. Philbrick's house in Brookline?

A. The soil pipe was run similar to the other; it was run from the sewer to the roof. The air pipe from butler's sink bowl in bath room and kitchen sink connected above the second story water closet, making the air pipe from butler's sink and bowl and kitchen sink connected with the same stack of pipe above the second story water closet.

22 *Q.* Please examine the drawing marked Exhibit Philbrick 3, and state how that corresponds with the construction and arrangement of the plumbing in said house of Mr. Philbrick?

A. It is correct, substantially.

23 *Q.* Are the points of connection of the air pipes with the several traps correctly shown in said drawing?

A. As near as I can remember.

24 *Q.* Please look at the bill put in evidence in this case, and marked Exhibit Hawthorn & Tucker Bill, and state what that is?

A. Those are the charges for the work shown on Exhibit Philbrick 3.

25 *Q.* When was that identical bill made out?

A. February 8, 1877.

26 *Q.* When was it paid?

A. On the same date.

27 *Q.* Have you put the same construction of plumbing with ventilating pipes from the outside or upper portion of the trap, in any other houses or buildings in Boston?

A. Yes, sir.

28 *Q.* Please mention some of them?

A. I have done it in a number; I can't precisely remember the names.

29 *Q.* How early did you know of the same arrangement of ventilating pipes from the outside or upper portion of the traps being used in Boston?

A. I have seen it between 1852 and 1853, in the Thorndike Building, in Summer street, Boston. It is now burned down.

30 *Q.* Please describe the arrangement in said Thorndike Building, as you saw it in 1852 or 1853?

A. There were three closets and one stack of pipe. When the upper closet was used foul air was forced through the lower closet. An air pipe from the lower closet was run up from the outer side of the trap as before, and connected with the continuation of the main stack through the roof, or run out separately, I disremember which.

31 *Q.* Did you remove the difficulty?

A. Yes.

32 *Q.* Was there any secrecy about the use of these systems of plumbing, or the ventilating air pipes for the traps, which you have described?

A. Not that I am aware of.

JAS. A. TUCKER.

Sworn to before me this 6th day of June, 1881.

JOSEPH GUTMAN, Jr.,
Examiner.

Adjourned to June 7, 1881, at 10 A.M.

NEW YORK, June 7, 1881—10 A.M.

Present—C. WYLLYS BETTS, ESQ., Counsel for defendant.

ISAAC RILEY, a witness of lawful age, produced on the part of the defendant, having been by me first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth in the matter of controversy herein, and being examined by Mr. Betts, deposes and says as follows:

1 *Q.* What is your name, age, residence and occupation?

A. My name is Isaac Riley; I am 46 years old; I reside in Boston, Mass.; I am a plumber.

2 *Q.* How long has your occupation been that of a plumber, and to what extent have you been acquainted with systems of house drainage?

A. I was apprenticed to this business in 1847. I have been in business since 1867. My experience has been extensive in drainage and ventilating.

3 *Q.* What experience have you had in ventilating, and when did it commence?

A. It commenced about 1872, in what I would call scientific plumbing. For twenty years I had ventilated traps in soil pipes singly, but did not combine them together in one system till about 1872, at which time I combined two traps separately with one ventilation pipe.

4 *Q.* Please state what work you have done in combining two or more traps in a system of ventilation, and for whom the work was done and when?

A. The first work I did in combining two traps was commenced June 10, 1872, and finished June 18, 1872, in the house of H. W. Suter, 71 Newbury street, Boston, Mass. The date I find from our ledger. There were two traps on separate stories; they both connected with one soil pipe. For ventilation I put in a lead pipe three-fourths of an inch in diameter, running parallel with the said pipe, and running up through the roof and open to the air there. The traps used were D traps, and from the top of each a three-fourths inch pipe lead to and opened into the ventilation pipe.

5 *Q.* What was the purpose of this system of ventilation?

A. At that time the only object I had was letting the gas escape, because I found that the gas corroded the lead.

6 *Q.* What was the next case in which you connected traps with ventilating pipes?

A. Mrs. T. B. Curtis, No. 45 Mount Vernon street, Boston. That job was commenced June 28, 1873, and finished July 14, 1873. There were two traps on separate stories leading into the same soil pipe; at the top of each trap an inch and a half lead pipe led upward to a ventilation pipe, an inch and a half in diameter, this ran up paralled to the soil pipe to the roof open to the air.

7 *Q.* Describe the next work that you did in ventilating traps?

A. W. P. Mason, No. 75 Beacon street, Boston. There were three traps there; D-traps—on separate stories—water closet traps. The work was commenced August 18, 1876, and completed October 25, 1876. The soil pipe was four inches which was reduced to two inches before it got to the roof, and the ventilation of the traps was one and a half inches. The arrangement was similar to the others, the ventilation pipe ran parallel to the soil pipe up

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through the roof to the air, separate branches an inch and a half in diameter went from each trap to the ventilation pipe.

8 *Q.* Describe any other work you did in ventilating traps?

A. W. S. Dexter's house, No. 24 Mount Vernon street, Boston. That was commenced June 19, 1876, and completed August 29, 1876. The soil pipe was four inches full size through to the roof. There were four water closet traps on four separate stories in the house. Two of these traps opened into the upright soil pipe, and the other two—on the basement and first floor—emptied into the cellar drain into which the soil pipe led.

The basement trap was an S-trap; the other three were D-traps.

Parallel to the soil pipe there was a ventilation pipe, separate from it. Into this, from the top of each of the four traps, were connections of lead pipe; an inch and a quarter in the basement, inch and a half on the first, inch and a half on the third and fourth.

I produce a drawing which shows the work done by me in this house of Mr. Dexter's in 1876, except that the two lower traps are there represented as emptying into the soil pipe instead of into the cellar drain. In all other respects it is correct. The three upper D-traps are represented by the letter A, the S-trap in the basement by the letter B. The ventilating pipe and soil pipe are marked by name. The ventilating pipe which led from the top of the S-trap in the basement ran up, with a diameter of 1¼ inches, to about the point marked in the drawing 1¼—namely, to a point just below the point where the ventilating pipe of the lowest D-trap entered the main ventilating pipe. From that point the ventilating pipe was enlarged to 1½ inches up to the point marked 1½ on the drawing. It was there enlarged to two inches and so continued up to the part marked 2 in the drawing, which runs just underneath the roof. The remainder extending through the roof was 3-inch pipe.

The D-traps used in all the foregoing instances had an air space above the water line, and it was from the top of this air space that the ventilating pipe in each case led to the main ventilating pipe.

The drawing referred to by the witness is offered in evidence and marked Defendant's Exhibit Riley No. 1.

9 *Q.* What was the result effected by the system of ventilation described in your last answer?

A. The results were that there was no suppressed gas remaining in the drain or soil pipes, and no syphonic action possible with that ventilation.

10 *Q.* Were these ventilating pipes, which you have described as placed by you in the houses of Mr. Suter, Mrs. Curtis, Mr. Mason and Mr. Dexter, in any sense experimental?

A. No, sir; not experimental at all. I knew from experience that the connection of these pipes would fully ventilate the traps, and this was the chief reason why the connection was made, because a D-trap has rarely been known to syphon.

11 *Q.* Was there any secrecy in the work which you have described as done by you and your workmen upon these four houses?

A. None whatever; it was done in the most public manner that it could be done. There were masons and carpenters and painters about continually while the work was being done in the Dexter house, as general repairs were then in progress.

12 *Q.* Has the work that you have described in these four houses remained the same from the time you put it in till the present?

A. Yes, sir; except that in the Suter house a year or two afterwards I put in an inch and a half pipe in place of the three-quarter inch pipe. The others remained the same. I am now making some repairs in the Dexter house, and within the past week I have seen the work I did in 1876 unchanged.

13 *Q.* Has the operation of the system of ventilation of traps which you have placed in the four houses above described, been successful or unsuccessful?

A. Successful; the ventilating pipes carried off the sewage from the sewer and soil pipe, and prevented the corrosion of the pipes, and prevented the gas from escaping into the house; and the syphonic action.

In some cases I have also put in an inlet for fresh air at the top of the running trap between the lower and the main house drain; through the inlet the air passed in through the drain and up through all the pipes—soil pipes and ventilating pipes—to the roof. I put the fresh air inlet in the house of Mr. Suter, I think, in July, 1877.

14 *Q.* Are you familiar with the Letters Patent granted to J. McCloskey for improvement in sewer pipe connections, dated August 26, 1879, No. 218,891, and if so please compare the same with the apparatus you placed in the four houses as above detailed, and state whether there is any substantial similarity or difference between them in construction and mode of operation?

A. I am familiar with the patent, it has always been a puzzle to me what McCloskey could gain from his open air inlet at the base of his ventilation pipe, rather than having the pipe open into the soil pipe below; for his system admits no fresh air to the soil pipe but only to the ventilating pipe.

In all respects the apparatus described in the patent is substantially the same as that put by me into these four houses.

ISAAC RILEY.

Sworn to before me,

JOSEPH GUTMAN,
Examiner.

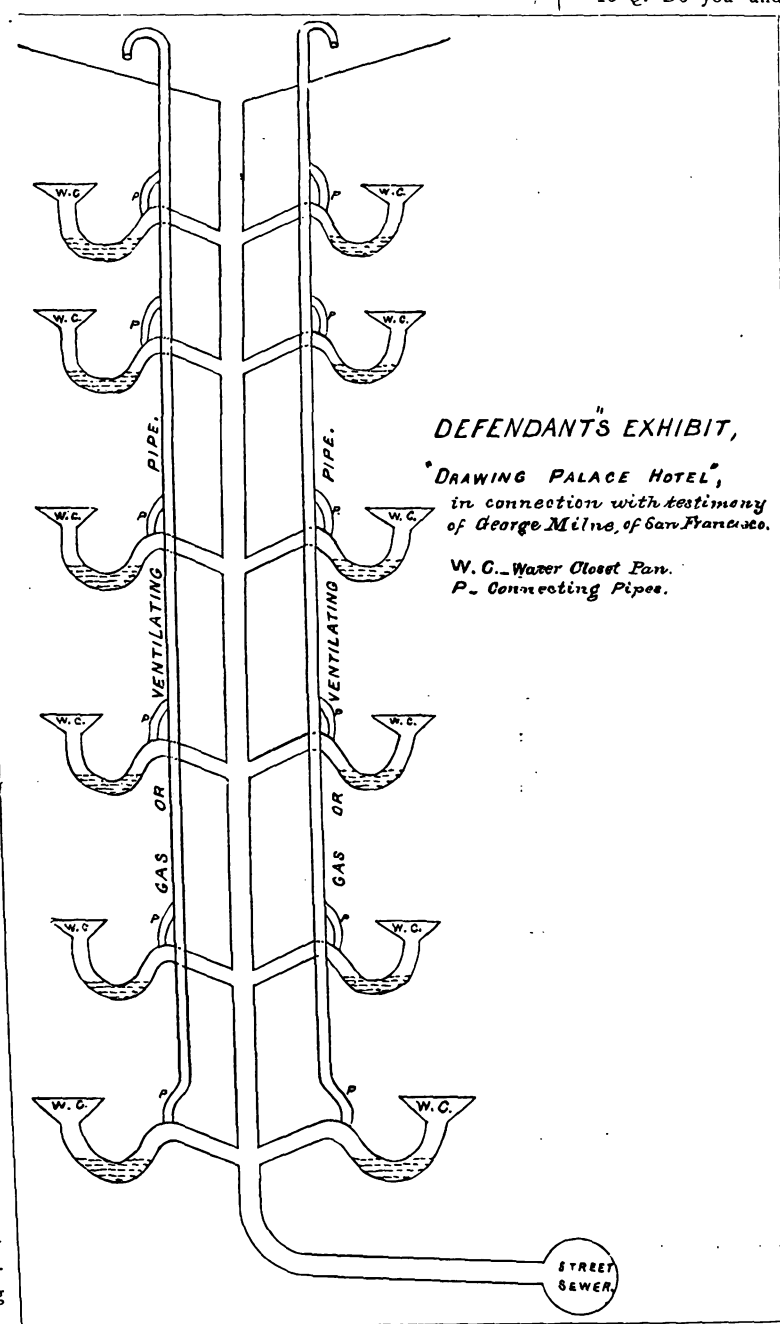
The following deposition of Mr. George Milne, of San Francisco, was also submitted:

OFFICE OF EDWARD HEATON,
Solicitor for Defendant,
Room 1, 49 Nassau St.,
NEW YORK, April 6, 1881.

Met pursuant to adjournment.

Present—EDWARD HEATON and FREDERICK H. BETTS, of counsel for defendant.

GEORGE MILNE, a witness on behalf of defendant, being produced, and duly sworn, testifies as follows:



1 *Q.* What is your name, residence and occupation?

A. George Milne; San Francisco; plumber.

2 *Q.* About how old are you?

A. Forty-five years of age.

3 *Q.* How long have you been engaged in the plumbing business?

A. Since 1852.

4 *Q.* Are you acquainted with plumbing in all its branches?

A. Yes, sir.

5 *Q.* Where, and how did you learn the business of plumbing?

A. Served five years in New York City with William Rhodes, a plumber of this city. His place of business was 827 Broadway. I worked here after serving my time, about three years, I should judge. From here went to San Francisco. Have been practicing my business there ever since.

6 *Q.* What has been your business experience and connection in San Francisco in this business?

A. I have plumbed the largest buildings that have been built there, such as the Palace Hotel; the residence of William C. Ralston; residence of Governor Stanford; residence of Charles Crocker, and others.

7 *Q.* How has your business compared with other plumbers there?

A. For ten years I consider that I have done a larger business in plumbing than any other plumber in San Francisco, of public and private houses.

8 *Q.* Are you acquainted with either the plaintiff or defendant in this suit?

A. No, sir.

9 *Q.* Have you seen the Complainant's Patent No. 218,891, Complainant's Exhibit No. 1? and have you examined the drawing and specifications therein?

A. I have.

10 *Q.* Do you understand thoroughly the invention claimed therein, as an invention for ventilating sewer pipe connections, etc.?

A. I do.

11 *Q.* Have you examined the model now shown you, Complainant's Exhibit No. 2, and do you understand the method of ventilating the traps, and the connections, and the waste and soil pipe connections shown on that model?

A. I have examined that model, Complainant's ExhibitNo. 2, and I understand the method of ventilation shown therein.

12 *Q.* Please state to the Court whether you have ever seen the method of ventilating sewer pipe connections, etc., in use and on sale, previous to July, 1877.

A. I have.

13 *Q.* Please state whether in the Palace Hotel in San Francisco, in which you state you placed the plumbing, what, if any, system of ventilating the soil or discharge pipe was used by you.

A. We ran a main soil pipe up; entered the closets into that, and from the trap of each water closet ran a separate pipe up to the roof, and from each trap connected with that ventilating pipe.

14 *Q.* Have you here a drawing showing how the water closets were connected with the soil pipe in said Palace Hotel in San Francisco, and how the ventilating pipes from the traps were arranged in said hotel?

A. Yes, sir. That is it.

Drawing offered in evidence, and marked "Defendant's Exhibit, Drawing Palace Hotel."

15 *Q.* What was the size of the soil pipe used by you in the Palace Hotel?

A. It was ten inches below, gradually tapering to four inches at the top.

16 *Q.* Into what did the soil pipe discharge below?

A. It discharged right into this 10-inch pipe, and then ran along in the cellar and into the sewer. All iron soil pipe inside the building ran right out into the sewer.

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17 *Q.* To what did the soil pipe open at the upper end?

A. At the roof, four inches.

18 *Q.* Did it open to the open air?

A. Yes, sir; it ran the water off the roof. It is a rain water leader as well as a soil pipe.

19 *Q.* How many water closets were there in said hotel arranged in connection with the same vertical soil pipe?

A. Six.

20 *Q.* Where did the ventilating pipe open at the upper end?

A. Up through the roof.

21 *Q.* What was the size of the ventilating pipe?

A. An inch and a quarter at the bottom and an inch at the top, that is, as near as I can recollect.

22 *Q.* When you have given the dimensions of pipes, do you mean the interior diameter?

A. Yes.

23 *Q.* How many vertical soil pipes were there in that hotel?

A. As near as I can recollect, about 38 or 40. I cannot swear positively.

24 *Q.* Were there water closets connected with each vertical soil pipe?

A. Yes.

25 *Q.* Were all the water closets arranged with ventilating pipes?

A. Not those in the cellar. All those above the first floor were.

26 *Q.* You say that you put in the plumbing in the Palace Hotel. When was it that you put this plumbing in?

A. About seven or eight years ago, as near as I can recollect.

27 *Q.* What year was it?

A. It was between 1874 and 1876; that is as near as I can come to it.

28 *Q.* What do you mean by "between 1874 and 1876?"

A. This work was in progress in this hotel.

29 *Q.* How early can you state that this plumbing work was finished in the hotel?

A. As near as I can recollect, it was finished some time in 1875. I can't say positively about that.

30 *Q.* How do you know it was not 1876?

A. Because I came here early in 1876, and the hotel, I know, was finished a long time before I came.

31 *Q.* How early in 1876 did you come here from San Francisco?

A. In April.

32 *Q.* Who did this plumbing work on the Palace Hotel?

A. Bush & Milne.

33 *Q.* Please give the full names of the partners composing the firm of Bush & Milne?

A. David Bush and George Milne?

34 *Q.* Where does David Bush now reside?

A. In Post St., San Francisco.

35 *Q.* Did said David Bush and yourself do all the plumbing work in the Palace Hotel that you have described?

A. Yes, sir.

36 *Q.* How long was said system of plumbing, including the management of soil and ventilating pipes and connections illustrated in Defendant's Exhibit Drawing Palace Hotel, used in such hotel?

A. It has been in use ever since it was built.

37 *Q.* How large a hotel is the Palace Hotel?

A. It contains about 1,200 rooms, as near as I can recollect.

38 *Q.* Did your said firm of Bush & Milne introduce the said system illustrated in the drawing Defendant's Exhibit Drawing Palace Hotel, into any other buildings in San Francisco, and if so, when and where?

A. Yes; in William C. Ralston's residence, previous to putting into the Palace Hotel; Gov. Stanford's residence, during the progress of the Palace Hotel; Charles Crocker's during the progress of the Palace Hotel; since that, in Cornelius Sullivan's house in San Francisco, and various other places.

39 *Q.* Do you know whether said system and arrangement of plumbing, as introduced by you into the residences of Mr. Ralston, Gov. Stanford, and Mr. Crocker, have or have not continued in use since the same was put in by your firm?

A. They have been continued in use.

40 *Q.* Do you know whether or not the same are still in use?

A. Yes, sir, they are.

41 *Q.* Did and does the arrangement of plumbing, including the soil pipe, ventilating pipe, and connections from the ventilating pipe to the water closet traps, differ at all in the residences of Mr. Ralston, Gov. Stanford and Mr. Crocker from the arrangement illustrated on the drawing, Defendant's Exhibit Drawing Palace Hotel?

A. The system is the same.

42 *Q.* What was the object and use of the pipes connecting the trap with the ventilating pipes, shown in the drawing Defendant's Exhibit Drawing Palace Hotel, and as introduced by your said firm?

A. To prevent syphonage of traps.

43 *Q.* Explain what you mean by "preventing syphonage of traps."

A. The object is that a column of water rushing down a pipe creates a vacuum and draws the water out of the trap, unless each one has a ventilating pipe, consequently leaves the trap unsealed, and sewer gas rushes into the house.

44 *Q.* How does the use of the connecting pipes from the traps to the ventilating pipe prevent this syphonage?

A. When the water falls down the soil pipe it would, if not for these pipes and their connection with the ventilating pipe, draw the water from the trap immediately after the water falling had passed the mouth of the trap into the soil pipe. By means of these pipes it is enabled to draw air from the ventilating pipe before it draws water from the seal of the trap.

45 *Q.* Are you about to leave the State and Southern District of New York?

A. Yes, sir.

46 *Q.* Where are you going to?

A. San Francisco.

47 *Q.* How soon do you expect to go?

A. In a week, more or less.

(Signed) GEO. MILNE.

Subscribed and sworn to before me this 6th day of April, 1881.

R. T. VAN BOSKERCK,
Notary Public.

There were also submitted in evidence for the defendant, "The Ventilation of Buildings," by W. F. Butler, 1873, D. Van Nostrand & Co., showing a diagram of the proper ventilation of a trap; a patent reissue, Nov. 30, 1875, to J. H. Morrell, for water trap supplies and connections; a drawing illustrative of house plumbing, from THE SANITARY ENGINEER of January, 1878; drawings illustrative of trap ventilation, from Weale's "Plumbing," London, 1876, and S. S. Hellyer's "Plumbing and Sanitary Houses," Baldwin Latham's "Sanitary Engineering," 1873, the *Manufacturer and Builder*, December, 1873, plan of working model of trap ventilation in the rooms of the Health Department of New York City; and a drawing from the Massachusetts State Board of Health report for 1876, showing the proper method for ventilating traps; and a *fac simile* of a bill of Messrs. Hawthorn & Tucker for plumbing in houses built by Mr. Edward S. Philbrick.

For the plaintiff, a model showing system of plumbing in the house of defendant, Mr. James H. Young.

The records of the case also include the testimony of Mr. Thomas J. Nealis, Sanitary Engineer to the New York Board of Health, and Mr. Henry McGuckin, plumber, of New York.

NOTES.

The public schools of Milford, Ohio, have been closed on account of the prevalence of scarlet fever.

The Board of Fire Escapes of Philadelphia has taken steps to compel the Board of Education to erect fire escapes on all the public schools.

Mr. Thomas J. Whitman, Chief Engineer of the St. Louis Water Works, is on a tour of inspection throughout the eastern cities.

Dr. Joseph D. Bryant, Professor of Anatomy in Bellevue Hospital Medical College, has been appointed by Governor Cleveland Surgeon General on his staff.

Schaghticoke village in this State has suffered severely from malaria, said to be caused by stagnant water created by the embankment of the Boston, Hoosac Tunnel, and Western Railroad, obstructing the natural flow of a creek. Governor Cornell several months since issued a proclamation ordering the removal of the embankment, and on the 5th inst. an agreement was held between the people of Schaghticoke and the railroad by which the latter agreed to at once remedy the nuisance.

The Board of Health in New Britain, Ct., has asked the city council for power to stop the attendance at the schools of such children as are known to have been exposed to the scarlet fever.

At Hyde Park, Ill., last week the water collector and his deputies shut the water off from a number of houses which were delinquent in the water rates.

The stove in the saloon of Zanoni and Bacciocco, on West Seventh street, exploded yesterday morning. It appears that the pipe having become choked up, there was no way for the smoke and gas to escape, and the explosion followed. The pipe was forced from its fastenings, and a large drum through which it passed was thrown across the room, and in its course came near demolishing the billiard table.—*Cincinnati Journal, Jan. 11.*

The Highway Commissioners of Philadelphia have under consideration an ordinance authorizing the opening of the streets for the purpose of laying steam heating mains and branches, after the system of the New York Steam Company.

Under date of Dec. 29, the Mayor of El Paso, Texas, telegraphs that there are only twenty cases of small-pox in the town at present, that the city is full of strangers and business is excellent.

Small-pox seems to be rather increasing in Baltimore, and some very sensational reports are being sent to the press of other cities as to its prevalence—as, for instance, that there are now over 1,000 cases in the city, etc. There seems to be a good deal of dissatisfaction among the medical profession of Baltimore with the present Health Commissioner, whose term of office, thus far, has certainly not been a happy one.

The Italian Benevolent Society of this city have given an order for preparing plans for a hospital, to be named in honor of Garibaldi, to Mr. W. H. Woods.

According to the Philadelphia *Enquirer* of Dec. 25, the Obstetrical Staff of the Philadelphia Almshouse have presented a communication to the guardians, setting forth that the mortality from puerperal fever in the hospital during the last twelve years had been from three to four per cent., and attributing this high rate to imperfect ventilation. It is stated that "a microscopical examination of the air, both in the cellar and the wards, had revealed the germs of the disease." It is to be hoped for the credit of the Staff that this quotation is incorrect—for a man who would claim that he could distinguish by the microscope the germs of puerperal fever from other germs in the air is——well, never mind what he is.

AN UNTAMED PUMP ON THE RAMPAGE.

A man erected some kind of a new-fangled pumping apparatus for a rancher at Paradise valley. The pumping machine was to be driven by wind. The other day when a ten-knot breeze was blowing, the inventor "turned her loose." In about half an hour the machine flooded the cattle corral with water, and floated away the butt end of a hay-stack. The ranchman yelled to his machinist: "Stop her! stop her!" but it happened that provision for stopping was what the inventor had not thought of. Had it not been that the well was soon pumped dry, the whole ranch would probably have been washed away. Even after the well was dry, the machine threw mud and gravel so wickedly that to approach it was unsafe.—*Virginia City Enterprise.*

Philadelphia derives an annual revenue of $12,000 from telegraph, telephone, and electric light companies, for the use of its overhead and underground wires. Each company makes a return annually of the number of poles, etc., and a payment of $5 per annum for each mile of wire used for telegraph or telephone purposes, and $15 per mile per annum for electric lighting purposes is required. There are at present about 10,000 miles of wire in the city.

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Novelties.

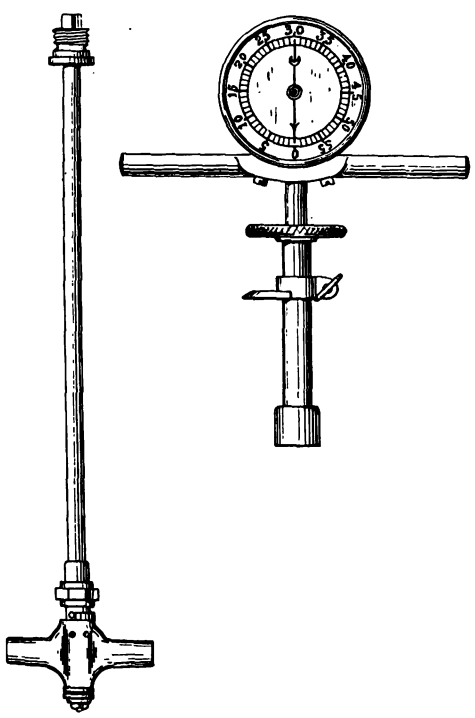
Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

CHURCH'S WASTE-WATER INDICATOR.

The following is a description of a "waste-water indicator," invented by Benjamin S. Church, C.E., of this city, and resident engineer of the Croton aqueduct.

The device consists of a pressure gauge, with arrangements for attaching it to the pipe through which water is suspected of leaking. Its most extensive application is designed to be to service pipes from street mains to houses. For this purpose, a special stop cock is placed on the service pipe under the sidewalk instead of the ordinary kind, and from it a pipe, or hollow stem, instead of a solid rod, runs up to the stop cock box. The shank

WATER-WASTE INDICATOR



INVENTED BY B.S.CHURCH, M.S.C.E. N.Y.

of the key, also, is hollow, and has a pressure gauge attached at the top. By means of a coupling, turned by a wheel at its top (shown just below the handles of the key on either side of the gauge), an air tight connection is made between the stem and the key. When the cock is closed (by turning the cross-arms, and with them the gauge, which is fastened to them), a small "port" in the stop cock plug establishes a connection between the street main and the gauge; the air in the stem is compressed, and the hand on the gauge indicates the hydrostatic pressure in the main. By turning the plug to another position, a second "port" is opened, allowing the water to flow through, if there be any escape from the pipes in the house. If that be the case, the gauge will indicate a diminished pressure, depending on the amount of discharge. The plug can also be turned to a third position, leaving it open to the house and closed against the street. By this means the approximate height of the leak (if such is found) is ascertained. The exact position of the ports is indicated on a scale, with vernier, which slides up and down the coupling, to be clamped at the level of the sidewalk for convenience in making reference marks thereon. The gauge is said to indicate a flow of five gallons an hour, and "reveal the least leakage, even to the size of a pin-hole." The apparatus may also be applied to street mains to detect leaks in them.

It has been tested to a limited extent during the past year by the Department of Public Works of this city, but the results of the tests have not yet been made public.

Construction Notes.

CHICAGO.—The aldermen, influenced by the Milwaukie fire, propose directing the Board of Education to build additional stairways to the second and third stories of all school buildings. Keys are also being newly fitted to theatre exits.

Last year, according to the report of the Building Permit Clerk of Chicago, there were 5,824 taps inserted, of which 1,563 were made for contractors for street improvements. The number of permits issued for making connections was 577; for tapping, 4,649; for miscellaneous connections, 1,313; making a total of 6,539 permits issued. One hundred and eighty-one licenses were issued to plumbers, and 347 leaks in water pipe were repaired.

IOWA CITY.—About two and a half miles of water mains have been laid for the water works, Holly system.

PHILADELPHIA.—The business men's organization have reported a plan for reform in street cleaning and repairing which provides for dividing the city into 50 districts, and gives the Board of Public Works absolute power to let and annul the contract in each. On complaint of seven property owners payment to a contractor may be stopped. The cost of cleaning and repairing the streets is to be assessed per front foot on the property owners.

CINCINNATI.—A resolution has been introduced into the Board of Public Works requesting the City Engineer and the Superintendent of Water Works to report on the possibility of removing the pumping works to Markley Farm, on the ground that the removal would allow a cheaper system of trunk sewers to be devised than that which is now provided for in the bill now pending in the State Legislature.

OHIO.—It is proposed to enact a general law providing for the construction of "trunk sewers" in cities of the first grade of the first class, by a tax of one mill on the dollar for five years. The fund thus provided is to be kept separate from other city funds and to be applied to the payment of the cost of "trunk sewers" over the amount authorized to be assessed on property benefited by branch and lateral sewers. This is a good idea and might well be adopted in other States also.

NEW ORLEANS.—A resolution repealing the ordinance by which the mayor was authorized to enter into a contract with the New Orleans Drainage and Sewerage Company to establish a system of sewerage was introduced in the City Council the 9th inst. and laid over.

CHICAGO.—The annual report of the Building Department of Chicago shows that 8,113 new buildings were erected in that city last year, at a total cost of $15,842,800.

ATHENS, GA.—The Savannah *News* says that "the question of the Athens water works is exciting interest in that city. The preliminaries have been arranged, and the water works will doubtless be in operation in a short time. Some of the property owners threatened to enjoin the city, but better counsels prevailed and this matter has been settled."

ANSONIA, CT.—The water company have purchased the Judge Quilinan property, on which is situated a large dam, for an additional supply of water for the borough. The dam will be raised five feet higher and will store 27,000,000 gallons.

HAMILTON, ONT. has now 59.82 miles of main pipe within the city limits, with 473 fire hydrants, 220 main stop valves and 8,150 house services. The pumping house, reservoir and city are connected by an 18-inch and a 20-inch main.

PHILADELPHIA, PA.—Synopsis of bids for iron stairways for post office and custom house opened Jan. 3.

C. Hitzeroth	$2,525 00
Bartlett, Haywood & Co	4,350 00
Snead & Co	4,473 00
R. Tippetts & Son	4,900 00
Phœnix Iron Co., Trenton	5,197 00
Haugh, Ketcham & Co	5,904 94
W. Bugbee Smith	6,250 00
S. J. Creswell	7,200 00
Cheney & Hewlett	8,169 00

Mr. C. Hitzeroth has been awarded the contract.

NEW YORK CITY.—The following bids were opened by the Commissioner of Street Cleaning, on the 15th inst.:

Name of Bidder.	Price per cu. yd. for Removing			
	Sweepings.	Ashes.	Garbage.	All Refuse Together.
John Fox				14½ cts.
John A. Bouker	14½ cts.	17½ cts.	23½ cts.	19½
John Scolly and John Martin				19
Joseph Walsh				18
Albert Daggett				16½
F. Theo. Walton				16½
F. J. O'Reilly	15¾	15¾	15¾	15¾
Barney Dumping Boat Co.				15

The following bids were opened Jan. 5, at the Treasury Department, Washington, D. C. Slating for the custom house and post office at Topeka, Kansas.

Knissel Bros. & Miller	$2,800 00
Edward Williams	2,860 00
E. B. Clark	4,100 00
W. W. Selby	2,800 00*

Plumbing and gas fitting materials for custom house and post office, Paducah, Ky.

	Amount.	Galvanized Fittings.
Thomas Somerville	$1,068 14.	19 cts. per lb.
Hayward & Hutchinson	691 87.	30 cts. per lb.

NEW YORK.—The following bids, by R. A. Robbins and Samuel W. Sears, respectively, were opened at the Department of Public Charities and Corrections on the 12th inst.

For 20 boxes best charcoal tin, 10 x 14, IC	$6.38
	6.24
" 20 " " " 10 x 14, IX	7.67
	7.48
" 20 " " " 14 x 20, IX	7.67
	7.58
" 10 " " " 12 x 12, IXX	9.59
	9.47
" 20 " " " 14 x 20, IXX	8.94
	9.24
" 10 " " " 14 x 20, IXXX	10.23
	10.47
" 100 " T roofing tin	5.58
	5.48
" 1,000 pounds L. & F. block tin	22.84
	22.24

Higinbothem Bros. offered to furnish the whole lot for $1,645.

SYRACUSE, N. Y.—The Hilton Bridge Company, of Albany, has been awarded contract for two lift bridges over the Erie Canal, for New York, West Shore and Buffalo Railroad. The two bridges will cost over $40,000, including the hoisting machinery, which is to be furnished by the Delamater Iron Works, of New York city.

EAST ST. LOUIS, ILL.—The East St. Louis and Belleville Water Company has been incorporated with a capital of $100,000.

DANVILLE, ILL.—Proposals will be received by K. P. Corbyn until Jan. 23, at the office of the Water Works Company for the machinery, buildings, stand pipes, hydrants, etc., for the water works.

YONKERS, N. Y.—Proposals should be sent to the Water Commissioners until Feb. 1, for a high pressure steam-pumping engine and boiler, capable of raising 1,000,000 gallons in 24 hours to a height of 100 feet.

THE SEWERAGE OF NORFOLK.

NORFOLK, VA., *Jan.* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

Work was commenced on the sewer system here in the latter part of February, 1882, and has been since prosecuted, with some interruptions, not occasioned by the character of the work itself. We commenced reducing force about the 1st of June, and entirely suspended work on the 28th of July. We did not resume until about Nov. 1, thus losing the dryest, and for that reason the best part of the year. The system has been constructed substantially in accordance with the plans devised by Col. George E. Waring, a description of which was published in THE SANITARY ENGINEER about two years since. It is intended to provide for sewage and sub-soil water only. It consists of a system of pipes, beginning with 6-inch, draining a length of not more than 1,500 feet, and gradually increasing to 18-inch, draining 35,000 feet. The sewage will be discharged into a well, from which it is to be pumped into Elizabeth River. Two 3-million gallons Davidson pumps have been provided for this purpose. The city is generally underlaid with a thin bed of sandy clay, in many places not three feet thick; below that, fine sand fully charged with water. It was found necessary to

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close shut nearly all of the trenches and to batten some of the joints between the planks in the deep ones, to keep out the sand. A part of the city is built upon made land, and trenches in this section sometimes encountered mud of such consistency as to flow in under the sheathing and rise up in the trench about as fast as taken out. In some places it was found necessary to drive 3-inch sheeting six or seven feet below grade, to prevent this inflow of mud.

We have about eight miles of pipe laid, and one of the mains will be completed and connected with the pump well in a few days. The house drains are of 4-inch pipe, and are laid to the curb stone by the city. The pump well is 23 feet deep, 12 feet in diameter, and is curbed with an 18-inch brick wall, which was sunk to position in the mud of the accretions on a cast iron shoe. For the removal of the sub-soil water from the well and the deeper trenches, the pulsometer has been used, and found quite satisfactory. Carson's excavating machine has been used in a portion of the deeper trenches with decided advantage. For driving sheeting we have in some cases used advantageously a hammer, which slides upon an iron bar passing through the middle of it, patented by D. Knowles, of this place. In many of the trenches the saturated sand was so quick that it was found necessary to lay the pipe on platforms of boards, which were placed a little below grade so as to make room for the sockets. Oyster shells, as the cheapest suitable material obtainable for that purpose, were used to fill in the platforms to the exact grade. Since it was not possible to keep the trenches free from water, it was apprehended that joints made of even the quickest setting cement would be dissolved before the cement could set. After the work was commenced it was determined to use the Stanford joint, and a subsequent examination of the pipes while laying house drains, has shown those laid with this joint to be in rather better condition than those laid with cement. For the information of your readers not already familiar with it, this joint may be described as composed of sulphur, coal tar, and sand, mixed in such proportions as to produce the requisite degree of hardness when cold, moulded upon the spigots and in the sockets, by means of male and female cast iron moulds, turned to fit accurately. A mixture of hot grease and resin is applied to the joint just before it is laid, the spigot is then inserted in the socket and pushed home by means of a spade used as a lever. This joint is made of sections of a sphere which permits some movement of the pipe without impairing the joint. The lateral sewers here have been usually laid from five to six feet deep, the mains generally 12 to 18 feet. Yours,

J. H. HUMPHREYS.

MAYOR LOW ON BROOKLYN MATTERS.

The annual message of Mayor Low, of Brooklyn, expresses the writer's belief that the system of responsibility to a common head has caused increased efficiency and economy, as it certainly has produced harmonious administration in the government of that city.

The permanent debt of the city has been increased $408,000 during the year 1882, and the temporary debt decreased $440,000.

The mode of paying for lands taken by the city under the right of eminent domain, is severely criticised. It has been customary to pay damages only as fast as assessments for benefit were collected.

The mayor says, very fairly:

"The Legislature will be asked for authority to issue bonds in amounts sufficient to pay all such outstanding awards. In my judgment, the city ought never to have been allowed to take a foot of land from any one until the damages allowed therefore had been paid in cash. A great city has no right to ask fair dealing of its citizens and then in its turn to deal with them unfairly."

"He who asks equity must do equity."

The Brooklyn Bridge management gets a pretty hard slap. Mr. Low says:

"The annual interest charged upon our bridge bonds at this time is $660,550. Of this sum $210,000 have been raised annually in the tax levy. The balance of interest has been paid with the proceeds of bonds. Since the beginning of the work bonds have been issued to pay interest to the extent of $1,809,625.

"As a means of concealing from the citizens what the bridge would cost to carry, such financiering has much to commend it. As a method of constructing a great public work it cannot be so easily justified."

The condition of the water supply is briefly recited. New engines, more pipe and the procuring of an additional supply by tube wells have been provided for. The Chief Engineer, Mr. Robert Van Buren, is highly commended and attention is called to the ridiculously small salary he receives.

The several suggestions as to changes in municipal methods show careful study and much thought. It is, of course, impossible to agree with all of them, but they are all worthy of careful consideration by the citizens of Brooklyn.

The laying of a tax on private corporations occupying public streets for the purpose of accommodating the public is advocated. This is one of those matters in which a great deal is to be said on both sides of the question. Mr. Low thinks that a percentage of the gross receipts should be paid into the City Treasury. Whether it is better to do this, or to insist on moderate fares and good accommodation is not certain. Thorough inspection and policing seems more necessary to many persons than the extraction of the forced money contribution from the companies.

Mr. Low's ideas regarding the public service will seem outrageous to most of our "ruling class," but nevertheless they are sound, and there could be no good and economical government until they are put in practice. The mayor puts the case plainly and his words ought to be carefully weighed by the tax payers of other cities as well as Brooklyn. He says:

"I repeat my belief that it would be greatly in the interest of the city to have some system adopted for entrance into the subordinate civil service of the city which should reduce personal patronage to a minimum. Such a system, if practically successful, would leave heads of departments much more free than now to attend to the business of the city. I think it would even relieve the members of your honorable Board from occasional embarrassment. It would certainly make the city the real master of its own clerical force. The people do not recognize to what an extent, in the absence of such a system, outside politicians usually control, and make and unmake the clerical force of the city."

Reviews of Books.

AMERICAN FOUNDRY PRACTICE. A Practical Treatise upon the Managagement of Cupolas and the Melting of Iron. By Thomas D. West. New York: John Wiley & Sons.

The book gives the views of a practical moulder and manager of foundries on the various questions arising in the daily experience in a foundry.

The articles were, to some extent, originally printed in the *American Machinist.* The leading points touched on are, The Moulder and the Foundry; Green Sand Moulding; Loam and Dry Sand Moulding; Manipulation of Iron Castings; Notes and Recipés. Pattern makers and moulders in considering the best method of making difficult castings will, we believe, find suggestions in it which will be of service to them. We can commend the book as the best one we know of in its special line.

The publishers of the *Sanitary Record and London Medical Record* have issued a Diary for 1883 which will prove a convenience to professional men. There are some sixty pages of miscellaneous data useful to medical men, and a blotting leaf between each page of the diary. The large number of advertisements suggests that the enterprise has not been without profit to its projectors.

The *American Machinist* of Jan. 20 prints several pages of letters from representative machinery manufacturers in all sections of the country, giving their views of trade present and prospective. These responses were received in reply to an inquiry sent out by the *Machinist.* The testimony all seemed to be expressed in the following suggestive statement of one firm: "Being decidedly of the opinion that this country is not yet finished we have no doubt that somebody will have something to do." We further notice that our cotemporary says the "number of subscriptions daily received is greater than at any other period since its establishment." It is gratifying indeed thus to see that honest and able management in special journalism has been so substantially rewarded as in the case of the *American Machinist.*

BOOKS RECEIVED.

REPORT OF THE COMMITTEE OF THE METROPOLITAN HOSPITAL SUNDAY FUND, 1873, 1874, 1876, 1877, 1879, 1880, 1881, 1882.

CIRCULARS OF INFORMATION OF THE BRUEAU OF EDUCATION, Nos. 2 and 3, 1882. Washington: Government Printing Office. Also, NATURAL SCIENCE IN PRIMARY SCHOOLS; HIGH SCHOOLS FOR GIRLS IN SWEDEN; NATIONAL PEDAGOGIC CONGRESS OF SPAIN; INSTRUCTION IN MORALS AND CIVIL GOVERNMENT.

Building Intelligence.

NEW YORK CITY.

Nassau st, e s, bet Liberty and Cedar sts; cost $1,000,000; o, Mutual Life Ins. Co., 144 Broadway, N. Y.; a, C. W. Clinton; m, Joseph Thompson; c, not selected... 76 Pike st, five-story iron and br ten; cost $12,000; o, Theodore H. Calam, Sing Sing, N. Y.; a, Jas. S. Wightman....Pike st, two iron and br ten; cost each, $16,000; o and a, same as last....No. 82, n w cor Cherry st, iron and br ten; cost $21,000; o and a, same as last....Broadway, s e cor Prince st, two br and Wyoming st stores; cost ea abt $150,000; o, William Astor; a, Thomas Stent; b, not selected ...254 Bowery, br and st store and dwel; cost $20,000; o, John J. Astor; a, T. Stent; b, J. Webb & Son and J. Downey....328 Broome st, br ten; cost $12,000; o, Thomas Patten; a, W. Graul....Canal, junct Walker st, br fact'y; cost $45,000; o, Oxley, Giddings & Enos; a, Wm. Field & Son....11th ave, s e cor 20th st, br office; cost $625; lessee, L. F. F. Genet, Pamrapo, N. J.; a and b, E. Smith .. 38th st, s s, 75 e 6th av, br store; cost $15,000; o, Gustav H. Safft; a, M. V. B. Ferdon; b, James P. Niblo.... 53d st, s s, 103 w Lexington av, four br and b s ten; cost ea $15,000, o, John Davidson; a, A. B. Ogden....70th st, s s, 425 w 10th ave, brick office and factory; cost $——; o, a, and b, Lemuel De Rache....3d av, n e cor 104th st, br flat and store; cost $18,000; o and b, Thomas Fealey; a, Barth. Walther....3d av, e s, 20 n 104th st, three br flats and stores; cost ea $15,000; o, b and a, same as last....104th st, n s, 72 3d av, br ten; cost $13,000; o, b and a, same as last ...111th st, n s, 195.11 w St. Nicholas av, six br dwel; cost ea $8,500; o, Edward J. King; a, D. & J. Jardine; b, John P. Schweikert and Grissler & Fausel.

ALTERATIONS, NEW YORK CITY.

14th st, Nos. 116 and 118 E., repair demage by fire; o, Wm. C. Schermerhorn, Wall st; a, D. Lienau; b, B. Blachledge and L. N. Williams. ..104 Wooster st, add, front and interior alter, also brick exten; cost $5,250; o, George Rueckert; a, F. W. Klemt; b, Wagner & Pfeiff....13 and 15 Park Row, add one story, mansard roof, etc.; cost $10,000; o, John H. Cheever, 89 5th av and 29 Park Row; a, George E. Harding.

BROOKLYN.

Interior location, 500 n Greenpoint av, and abt 250 w Newtown Creek, br boiler house; cost $6,250; o, Central Refining Co., Greenpoint, L. I.; a, G. H. Budlong; b, James Rooney and Thomas Davis ....Rodney st, s s, 100 Wythe ave, br dwel; cost $6,000; o, William Wendt; a, E. F. Gaylor; m, Thomas Gibbons; c, not selected....Lafayette av, n s, cor Sumner av, nine fr dwel; cost ea abt $3,500; o, Charles J. De Bevoise... Read av, s w cor Lexington av, b s store and dwel; cost $7,000; o, a and b, Jas. A. Thomson... 17th st, n e s, 200 s e 5th av, five fr tens; cost each $2,500; o, E. F. Hermans....256 Prospect av; a and c, George Hermans; m, not selected....Gates ave n s, 270 e Clason, three br dwel; cost ea $10,000; o and c, D. H. Fowler; a, Amzi Hill; m, Wm. Kane.

BALTIMORE, MD.—Fairmount av, 1 br b; o, John Snyder....Mount st, s e cor Tenent st, 15 br b; o, A. Mahone....Mount st, w s, cor Tenent st, 7 br b; o, A. Mahone .. Bolton st, w s, 10 br b; o, Sam'l Black... Central av, e s, 1 br b; o, Jos. Rosenberger.... McEldrey, n e, 1 br b; o, Wm. Keyler....Druid Hill av, 1 br b; o, C. F. Rechter....Robert st, s s, 7 br b; o, C. F. Reichter.... Chase st, s e, 1 br b; o, Ben'j. B. Schneider.

CHICAGO, ILL.—Calvary Cemetery, gray granite mansoleum, a miniature gothic chapel; cost $6,000; o, Michael Keeley; a, P. J. Eagan; b, Wm. H. Barstow....Calvary Cemetery, mansoleum a red granite chapel; cost $10,000; o, P. J. Sexton; a, P. J. Eagan; b. P. J. Sexton....Calvary Cemetery, carved stone entrance; style, early English gothic; cost $10,000; o, Catholic bishop; a P. J. Egan; b, Wm. H. Barstow....88 Fisk st, b stores and flats; cost $10,000; o, John Bednorz; o J. M. Kralorec; b, J. M. Kralorec....501 & 563, S. Clark st, b store and dwell, cost $6,000; o, C. E. Robinson; a, W. S. Crilly; b, C. E. Robinson....356 Ohio st, b. dwell; cost $15,000; o, J. S. Clark; a. Freat & Folz; b, undecided .. 557 Larrabee st, b dwell, b stone and dwell; cost $5,500; o, Henry Newville; a, J. A. Ackerman; b, C. Leuhring.... 86 Fourth av, b store and dwell; cost $22,000; o, Andrew Scott; a, A. J. York; b, not decided....329 Polk st, b store and flats; cost $6,000; o, M. Mercer; a, none; b, M. Mercer....Dearborn av, nr, Division st; green stone dwell; cost $10,000; o, J. C. Cummings; a, Edbrook & Burnborn; b, undecided....Van Buren & Pacific av, just south of new chamber of commerce; br, offices covering ½ block; cost probably $400,000; o, Armour, Kent, Bensley *et al.*; a, Burnham & Root; b, undecided.

CLINTON, IOWA.—Across Maguoketa river nr Preston in Jackson Co, Iowa, an iron combination bridge; cost $20,000; o, Jackson Co.; a, J. Scott-Jenkins; b, Jenkins Bridge Co... Veneered store; building, 24 x 60, at State line; cost $5,000; o, John Brewer; a, W. W. Sanborn; b, not let.

PHILADELHPIA, PA.—260 s. Fifth st; one br. factory and one br, foundry; o, Yeaton & Harris.. Paschall bet, 5th & 6th sts; one br mill; o, J. J. Hunter....Wyalusing av, bet 54th & 55th st; br slaughter house and stable; b, Chas. Christine....26th st north of Vine st; br, stable; b, Thompson & Bro.

SOUTH BEND, IND.—Scientific Hall, Notredame University, br and st; cost $50,000; o, The University; a, Edbrooke & Burnham; b, Lay Brothers of the Holy Cross....Addition iron to west wing University; cost $20,000; o, The University; a, Elbrooke & Burnham; b, the Brothers....Iron and st dome, 100 ft above roof, for University; cost $30,000; o, the University; a, Elbrook & Burnham b, the Brothers....Cincinnati cor Third and Central av, Grand Union Depot; cost $300,000; a, W. W. Boyington.

ST. LOUIS, MO.—Virginia bet Russel and Geyer avs, b dwel; cost $6,300; o, Nagel & Johnstone; b, sublet....20th, bet Mullanphy st and Cass av, b dwel; cost $5,000; o, Henry Seisnal; b, Ignatz Stock....Washington av bet 20th and 21st sts, b foundry; cost $10,000; o, Culver Bros.; a, W. C. Slicer; b, sub-let....Garrison, bet Washington and Lucas avs, b church; cost $7,000; o, Trustees of U.M.E. Church; a, A. Bemke; b, Sub-let.

WASHINGTON, D.C.—7th st bet K and L st; 7 br 2 story and cellar; cost $8,000; o, Abram Fisher; a, J. Germiueller....Pa av bet Green and Montgomery; 8 br dwel; cost $10,000; o, Jno; Gibbons; a, Jno. Dyer.

MISCELLANEOUS.

CINCINNATI, O.—Corry st, nr Vine st, br dwel; cost $6,000; o, Jacob Haas; b, Jas. A. Kuhlman.

DETROIT—18 Willis av, br, dwell; cost $5,000; a, A. C. Varney.

EVANSTON, COOK CO., ILL.—Eastlake residence, cost $10,000; o, Geo. P. Dunham; a, Edbrook & Burnham; b, James Connor.

WINNETKA, COOK CO., ILL.. Fr house, Queen Anne style; cost $10,000; o, J. O. Smith; a, Edbrooke & Burnham; b, James Connor.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JANUARY 6, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	9	13 5	1	11.1																		
Boston.....Mass	407,581	184	23 4	58	31.5	4	1	36	6	5	15		2	1	3	19		20	2	1	1		1
Cambridge.....Mass	57,432	22		4				4	1							3		1					
Worcester.....Mass	64,995	23	18.2	8	34.7	1		6	1							1		1		2			
*New Haven.....Conn																							
Providence.....R. I.	114,723	40	17.7	13	32 5	1		7	1	1	1		4		1	2		1			1		1
Total	679,250	278	20 8	84	30.2	6	1	53	9	6	16		6	1	4	25		23	2	3	2		2
EASTERN CITIES.																							
Albany.....New York	98,430	32	16.6	10	31.2			6	1	1	1		1		1	2	2		1		1		
New York.....New York	1,299,249	618	24.4	221	35.7	26	9	89	14	7	34	3	4	6	11	78		31		16	6		8
Brooklyn.....New York	633.763	270	21.8	102	37.7	8	1	37	11	4	17	1		5	21	27		20			2		1
Hudson Co.....New Jersey	228,025	82		32		4		6	2		4		2		10	5	5	2	6		1		1
*Newark.....New Jersey																							
*Camden.....New Jersey																							
Philadelphia.....Pa.	907,043	409	23.4	130	31.7	5	2	62	15		28	1	7	1	13	37	4	8		2		4	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	15	16.1	3	20.0			3								2							
Total	3,213,399	1,426	22.9	498	34 9	43	12	203	43	12	84	5	14	12	56	151	11	61	7	18	10	4	11
LAKE CITIES.																							
*Buffalo.....New York																							
Rochester.....New York	92.116	21	11.4	6	28.5	1		3		1	1	1				1					1		
Syracuse.....New York	54,696	15	14 0	3	20.0	1		5	1				1								2		
*Cleveland.....Ohio																							
Detroit.....Michigan	131,118	51	19.7	27	52.9		1	3	5		11			1	5	3							
Chicago.....Illinois	597,834	218	18.7	103	47 2	18	6	16	10	6	14	1	4		14	14	2	2		1	7	2	1
Milwaukee.....Wisconsin	135,233	41	17.1	21	51.2		1	4			2	2	1		1	3		1					
Total	1,010,997	346	17.7	160	46.2	20	8	31	16	7	28	4	6	1	20	21	2	3		1	10	2	1
RIVER CITIES.																							
Allegheny.....Pa.	89,038	26	15.1	9	34.6					1			2			3	1	1			1		
Pittsburgh.....Pa	191,523	82	21 8	23	28.0	6	1	9	1	1	5		10			4		4			1	1	3
Cincinnati.....Ohio	267,767	124	23.9	43	34.6	2		14	1		3	1	6		7	9	5	6		2	2		2
*Dayton.....Ohio																							
Louisville.....Ky.	131,529	61	3.9	16	26.2	1	1	9	2				3			4		1				4	
Indianapolis.....Indiana	86,529	15	8.8	4	26.6		1	5	1	2		1	1			1	1				1		
Terre Haute.....Indiana	30,464	8	13.5	1	12 5	2		1		1						2							
Minneapolis.....Minn	98,026	27	14.0	10	37.0	1	5	2			6	2				2	2						
St. Paul.....Minn	53,683	26	25.0	8	30.7			5			2		2			1	1	1		1	1	1	1
*St. Louis.....Mo.																							
Total	948,559	369	19.7	114	30.8	12	8	45	5	5	16	4	24		7	26	10	13		3	6	6	6
SOUTHERN CITIES.																							
District of Columbia..	Wh.	136,471	42		12		1	7							1	6	3	1	1				
" "	Col.	71,103	32		11			8						1		5	2	1					
Richmond,	Va. Wh.	38,526	18	23.9	2	11.1		4		1	1					1							
"	Col.	29,394	22	38 5	8	36.3	1	6								5							
Charleston	S. C. Wh.	22,699	12	27.0									1				1	1					
"	Col.	27,595	18	33.8	1	55.0		2				1	1			1							
Atlanta	Ga. Wh.	25,583	3	5 7																	1		
"	Col.	19,221	14	37.5	5	35.7	1	4								3							
*Savannah	Ga. Wh.																						
"	Col.																						
Nashville	Tenn. Wh.	31,993	23		6			4		1					2	3	1					1	
"	Col.	19,406	11		8			3								1							1
Memphis.	Tenn Wh.	18,677	11	30 2			1	3		2	1		1										
"	Col.	14,896	14	48.4	3	21.4		4		2	1			1							1	1	
*Mobile	Ala. Wh.																						
"	Col.																						
*New Orleans	La. Wh.																						
" "	Col.																						
Total White		273,949	109	20 3	20	18.3	2	18		4	2		2		3	10	5	2	1		1		
Total Colored		181,015	111	31.7	36	32 4	2	27		2	1	1	1	2		15	2	1			1	1	1
Total in 30 U. S. Cities		6,307,769	2,639	21.3	912	30.7	85	377	73	36	147	13	53	16	90	248	30	103	10	25	30	14	21
Dec. 23—Total in 28 English Cities		8,469,571	4,480	27 6			143			47	24		85		100					110		6	106
" " " 8 Scotch "		1,219,586	723	30 8			18			15	17		10		23					11			43
" " " 16 Irish "		843,553	622	38 3			12			18	2		5		20					9			12
" 9— " 166 German "		8,443,620	3,848	23.7	1,694		84		41	110	207		58		84					58	23		47

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to December 1, 1882.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending January 6, in 30 U. S. Cities containing an aggregate population of 6,307,769, there died 2,639 persons, which is equivalent to an annual death rate of 21.3 per 1,000, being precisely the same as for the preceding week. In the North Atlantic Cities the rate was 20.8; in the Eastern Cities 22.9; in the Lake Cities 17.7; in the River Cities 19.7; and in Southern Cities, for the whites 20.3 and for the colored 31.7 per 1,000.

The proportion of deaths under five years was 30.7 per cent., which is decidedly below the average; it is, as usual, above the average in the Lake Cities. Small-pox and diphtheria show a slight increase, and the same is the case as regards measles and scarlet fever. It will be seen that the death rates are, as usual, less than those in foreign cities.

OGDENSBURG, N. Y.—Health Officer, Wm. O. Bridges, reports the extensive prevalence of mumps.

BOSTON, MASS.—C. E. Davis, Jr., reports 57 cases of diphtheria, 33 of scarlet fever and 11 of typhoid fever.

WILMINGTON, DEL.—Dr. E. B. Frazer, Registrar, reports two cases of small-pox.

CINCINNATI, OHIO.—The report of Dr. D. D. Bramble shows the city to be free from small-pox.

LOUISVILLE, KY.—Health Officer Montgomery reports that nine cases of small-pox were recorded during the week. With one exception they were removed to hospital for treatment.

ATLANTA, GA.—Four cases of small-pox are reported during the week.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 18 new cases of scarlet fever and four of diphtheria.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports nine admissions, 15 discharges, 3 deaths, and 1,307 remaining under treatment.

PITTSBURGH, PA.—Dr. Snively reports two cases of small-pox.

DETROIT, MICH.—Dr. O. W. Wight reports 49 cases of scarlet fever, 55 of diphtheria and one of small-pox.

SAN JOSÉ, CAL.—Dr. Breyfogle, in reporting the population at 12,685, that under five years at 1,058, the deaths from all causes at

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31, and those under five years at 7, remarks that these are the largest mortality figures furnished by San José in the past six years.

SAN FRANCISCO, CAL.—For the week ending Jan. 5, Dr. Hoerch reports 99 deaths from all causes, 23 of which were under five years of age, three were from accident, one from cerebro-spinal meningitis, 19 from consumption, one diarrhœal disease, three diphtheria, two typhoid, 14 pneumonia, one congestion of lungs and six bronchitis.

CAMBRIDGE, MASS.—Dr. Holt's report for the week ending December 30 gives a total of 15 deaths, of which 6 were under five years. Of the causes given in our table, accidents occasioned one death, consumption two, diphtheria two, typhoid fever one and pneumonia one death.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths in a population of 11,650. No infectious diseases are recorded.

HUDSON CO., N. J.—The report for the week ending December 30 did not arrive in time for tabulation. There were 96 deaths, 47 being under five years of age. Accidents caused five deaths, consumption five, croup four, diphtheria two, typhoid fever two, scarlet fever eight, and acute diseases of the lungs seven.

MICHIGAN.—Reports to the State Board of Health show the prevalence of the following diseases, during the week ending December 30: neuralgia, rheumatism, consumption, bronchitis, intermittent fever, tonsilitis, influenza and pneumonia. Intermittent and scarlet fevers, croup and measles increased in their areas during the week. Small-pox is reported from two places in the State, Richmond, Osceola Co. and Ionia. Three cases of scarlet fever are reported at Marquette, among immigrants just arrived from England. The disease was contracted on the steamer.

NEW ORLEANS, LA.—The report for the week ending Dec. 30 was not received in time for tabulation. Deaths 135; white males 60, females 24; colored males 23, females 28; under five years, white males 11, females five; colored males seven, females six; over 60 years, white 21, colored ten. Annual rate 31.68, for white population 26.98, for colored 44.78. Small-pox caused nine deaths, scarlet and typhoid fevers one each, malarial fevers nine, puerperal fever one, diphtheria four, consumption 17, acute bronchitis four, pneumonia 13, croup one, and accidents seven.

BOSTON, MASS—The Board of Health has recently issued a circular signed by Dr. Duegan, to urge greater care in preventing the spread of typhoid fever. The discharges from the bowels of the typhoid patient are supposed to be the source of the greatest danger and it is directed that "all vessels used for receiving the discharges of the patient should constantly contain some disinfecting fluid." A five per cent. solution of chloride of zinc will be effectual and without odor or stain.

The sick person is to be placed in a room apart, and the case treated as f it were one of contagious disease.

BALTIMORE, MD.—The number of deaths for the week ending June 6, 1883 was 241, giving, according to the registrar's estimate of population an annual mortality rate of 30.64. According to a proper estimate of the population based on the U. S. Census the true mortality is 36.4. This high death rate is due mainly to small-pox, 79 deaths from which were recorded during the week. There were 18 deaths from diphtheria, five from scarlet fever, three from typhoid, one from measles, one from whooping cough; 87 deaths were of children under five years.

ONTARIO, CANADA.—The provincial health bulletins for the weeks ending Dec. 23 and 30, have been received. Bronchitis, neuralgia, anæmia, rheumatism, tonsilitis, and consumption occupy the prominent places in both reports. The zymotic diseases, such as whooping cough, scarlet fever, measles, and diphtheria, which have been limited in their area, are showing a tendency to increase.

CARDENAS, CUBA.—J. H. Washington, Vice Commercial Agent, under date of Jan. 5, reports the city as "distressingly healthy," from the doctor's point of view. No yellow fever or small-pox is reported present.

AUX CAYES, HAITI.—Consular Agent Dutton reports the continuance of small-pox. During the weeks ending Dec. 9 and 16 there were, respectively, four and two deaths from this disease.

HAVANA, CUBA.—Dr. D. M. Burgess reports for the week ending Dec. 30, that the cases of yellow fever which are now occurring are confined to rooms, localities, wharves, and hospitals where the disease prevailed during the summer months. Only three deaths were reported during the week from yellow fever. No deaths from small-pox or typhus fever were recorded.

PERNAMBUCO, BRAZIL.—Consul Henry L. Atherton sends report for the weeks ending Nov. 27 and Dec. 4, showing a death from yellow fever during the latter week, the first which has occurred this season. Small-pox is reported as having caused three deaths during the second, as against 11 deaths during the first week. Consul Atherton transmits the report of the Health Inspector for the quarter ending September 30, showing 1,209 deaths; males, 670; females, 539; of these 113 were caused by small-pox, 159 by consumption, 111 by convulsions, 18 by malarial fevers, 41 by diarrhœa, 13 by dysentery, 30 by bronchitis, 28 by pneumonia, and 14 by erysipelas.

RIO DE JANEIRO, BRAZIL.—Vice Consul General James H. Murray reports 226 deaths for the week ending Dec. 2. Small-pox caused 39 deaths; typhoid fever three, pernicious fever nine, and consumption 34. But for the prevalence of the small-pox the health of the city would be considered excellent.

ENGLAND.—In 28 English towns 4,480 deaths were registered during the week ending the 23d inst. The annual death rate in these towns, which had been equal to 22.3, 23.4 and 26.9 in the three preceding weeks, rose to 27.6. The rates reached 31.3 in Manchester, 32.1 in Preston, 32.2 in Plymouth, 32.9 in Newcastle-upon-Tyne, 36.9 in Huddersfield and 40.1 in Liverpool. The deaths referred to the principal zymotic diseases were 478, showing a decline from the numbers in the two previous weeks; 110 resulted from measles, 100 from scarlet fever 106 from whooping cough, 85 from "fever" (principally enteric), 47 from diarrhœa, 24 from diphtheria, and six from small-pox. The 24 deaths from diphtheria included 12 in London, two in Liverpool and two in Halifax. Small-pox caused four deaths in London and its outer ring of suburban districts, two in Newcastle-upon-Tyne, and one in Wolverhampton. The deaths referred to diseases of the respiratory organs in London, which had increased in the six previous weeks from 330 to 637, were 633 last week, and exceeded the corrected weekly average by 61.

SCOTLAND.—The return of the Registrar-General for the week ending Dec. 23, shows a rate of 30.8 in the eight principal towns. This rate is 6.3 above that of the corresponding week of the previous year. The mortality was lowest in Perth, 17.2 and highest in Glasgow, 37.5 per 1,000. No deaths from small-pox are reported. Glasgow furnished nine of the 11 fatal cases of measles which occurred in the eight towns, 17 of the 23 cases of scarlet fever, 11 of the 17 cases of diphtheria and 28 of the 43 cases of whooping cough.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the Registrar-General for the week ending Dec. 23, a summary of which is embraced in our table given above.

PARIS, FRANCE.—During the week ending Dec. 13 there were 1,094 deaths, males 614, females 480; under five years 282, over 60 years 235. Annual rate 25.38. Consumption caused 212 deaths, typhoid fever 49, scarlet fever three, small-pox seven, measles 16, whooping cough none, diphtheria and croup 43, acute bronchitis 45, pneumonia 75, and violence 37.

During the week ending Dec. 20 there were 1,202 deaths, males 638, females 564; under five years 293; over 60 years 279. Annual rate 27.91. Consumption caused 197 deaths, typhoid fever 84, scarlet fever one, small-pox nine, measles 18, whooping cough five, diphtheria and croup 35, acute bronchitis none, pneumonia 81 and violence 40.

BRUSSELS, BELGIUM.—During the week ending Dec. 16 there were 291 births and 178 deaths in the city and suburbs, corresponding to annual rates of 38.0 and 22.7 per 1,000. Of the decedents 66 were under five years of age Small-pox caused four deaths, scarlet fever none, measles and diphtheria one each, typhoid fever and whooping cough two each, croup three, diarrhœal diseases 17, acute lung diseases 33 and consumption 27.

ST. PETERSBURG, RUSSIA.—Consul General Stanton reports 655 deaths for the week ending Dec. 9; males 370, females 285; under five years 308; over 60 years 83; population 927,467. Small-pox caused 20 deaths. On Dec. 10 there were 795 patients in the fever hospitals, 75 in the small-pox hospital and 1,198 in the venereal wards.

CALCUTTA, BRITISH INDIA.—Consul General Mattson reports 312 deaths during the week ending Nov. 25, which corresponds to an annual rate of 37.5 per 1,000 of population, as compared with a rate of 33.0 during the previous week. Cholera caused 47 of the deaths, fevers 104, bowel complaints 44, tetanus 21, consumption five, pneumonia two, and accidents eight deaths.

The report of the Health Officer for October shows the registration of 739 births and 1,151 deaths. The births exceed the decennial mean by 121 and the deaths by 71. The annual death rate for the month was 31.8. Cholera prevailed sporadically and with rather more than usual severity. It caused 91 deaths against 38 in the preceding month and exceeded the decennial mean by 24. No deaths were registered from small-pox. The increased death rate in October was mainly caused by diarrhœal diseases.

MADRAS, BRITISH INDIA.—Consular Agent L. Strange sends the municipal return for the week ending Dec. 1, showing 338 live births, equal to a rate of 44.2, and 13 still births. There were 312 deaths corresponding to a rate of 40.8; males 158, females 154. Of these 258 were buried and 54 burned. Small pox caused one death, measles two, fevers 76, dysentery 28, and diarrhœa seven. No deaths from cholera were registered.

SHANGHAI, CHINA.—Vice Consul General F. D. Cheshire reports a third case of diphtheria in the foreign population during the week ending Nov. 28.

FOOCHOW, CHINA.—Vice Consul J. P. Cowles reports on Nov. 25 that there are rumors of cholera which are denied by the physicians.

PROPOSED LEGISLATION

ON

SUBJECTS OF INTEREST TO READERS OF THE SANITARY ENGINEER.

NEW YORK—*Senate.*

Date.	Introduced by	Title.
Jan. 10.	TITUS.	To authorize the city of Buffalo to issue bonds for construction of Bird avenue sewer.
Jan. 10.	BAUCUS.	To empower a company to dam the Hudson River at Halfmoon, Saratoga Co.
Jan. 11.	JACOBS.	To amend the law relating to the management of gas companies.

NEW YORK—*Assembly.*

Date.	Introduced by	Title.
Jan. 10.	SHERIDAN.	Providing that no steam boiler shall be exempt from inspection.
Jan. 10.	SHERIDAN.	To extend the sewer located on Third avenue, Brooklyn.
Jan. 10.	VAN ALLEN.	To amend the Act relating to water works companies.
Jan. 10.	CLARKE.	To amend the Act creating a Department of Street Cleaning in New York City.
Jan. 10.	ROESCH.	Relative to the manufacture of cigars in tenement houses.
Jan. 10.	KEYS.	To amend Act in relation to gas light companies.
Jan. 12.	MULHOLLAND.	To regulate the quality and price of illuminating gas.*
Jan 12.	CONSALUS.	To authorize the construction of a dam across the Hudson River at Halfmoon.

NEW JERSEY—*Senate.*

Date.	Introduced by	Title.
Jan. 10.	GRIGGS.	To provide for raising money where Boards of Health of cities of the second class have exhausted their regular appropriations on account of the prevalence of epidemic or contagious diseases.

OHIO—*House of Representatives.*

Date.	Introduced by	Title.
Jan. 10.	METCALF.	To authorize towns and villages of the second class to issue bonds to construct water works.
Jan. 11.	ALEXANDER.	To amend Section 2,125 so as to compel all boards of health in cities to appoint an inspector to report semi-annually on the sanitary condition of school houses.

PENNSYLVANIA—*Senate.*

Date.	Introduced by	Title.
Jan. 10.	ARNHOLT.	To regulate the levying, collecting and disbursing of water rents and taxes of cities of the second class.

PENNSYLVANIA—*House of Representatives.*

Date.	Introduced by	Title.
Jan. 9.	SNODGRASS.	For the better security of life and limb from crude petroleum.
Jan. 9.	HETHERSTALL.	To create additional means of escape in cases of fire from hotels, factories, etc.
Jan. 9.	VAN KIRK.	To secure the health and safety of persons employed in bituminous coal mines.
Jan. 10.	THOMPSON.	To protect the life and health of persons employed in bituminous coal mines.
Jan. 10.	NICHOLSON.	To prevent the obstruction and pollution of navigable streams.
Jan. 10.	STEWART.	To regulate the practice of pharmacy, the sale of drugs, and to prevent the adulteration of food.

FLORIDA—*Senate.*

Date.	Introduced by	Title.
Jan. 8.	POWERS.	To incorporate the Artesian Well Co. of Florida.

FLORIDA—*Assembly.*

Date.	Introduced by	Title.
Jan. 5.	MABRY.	To protect the public health against infectious diseases.

A resolution was introduced by Mr. McElroy, the 10th inst., that the Committee on Railroads be instructed to inquire as to the feasibility of lighting the Fourth avenue tunnel in New York City by electricity.

A death occurred at a Hester street tenement house, last week, from what the Board of Health physicians believe to have been typhus fever. Precautions were taken to prevent the spread of the disease, as requiring a private funeral and removing other patients to hospitals.

The Philadelphia Committee of one hundred has been holding civil service examinations to select a candidate for the reform members of the city council to support for the position of chief of the Water Department in place of Dr. McFadden, who has held the place for some years and reduced the expenses and increased the efficiency of the works. They have agreed to recommend a Mr. John Rowbotham, who has never, so far as we can learn, had anything to do with the management of water works.

* This bill provides that all gas furnished to New York and Brooklyn, used through a burner consuming five cubic feet per hour, shall be of a brilliancy, or illuminating power, of sixteen sperm candles, and at a price not to exceed $1.50 per thousand cubic feet. Penalties are provided for violations.

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AN EXPLANATION.

To the Editor of THE SANITARY ENGINEER:

I see by the issue of your paper, under date of January 11, 1883, that you have published a communication from a plumber by the name of Lindsley, that I claimed my patent system to have been indorsed by THE SANITARY ENGINEER, which is not true, but I do claim that my system has been indorsed and recommended by the sanitary engineers. The attempt to induce the councils of Philadelphia to pass an ordinance to control plumbing work, was made by Mr. Lewis O. Howell, Jr., as he had presented to the Board of Health a full copy of the New York Code of Laws, some six months ago; it was then referred to the survey committee of councils. When the survey committee were about to meet, they notified Mr. Lewis O. Howell, Jr., to attend the meeting, at which place he explained the way plumbing work should be done under the said laws, showing properly and improperly constructed systems of house plumbing.

The patent system of cold air ventilation with the patent angle ventilator, was not talked of for adoption; the main object was to induce them to adopt a code of laws similar to the ones adopted by the New York Board of Health.

I had the presumption to think that, as an American citizen, I had a perfect right to try and have an ordinance pass City Council, which I thought would benefit my fellow-man, without asking privilege of so great a personage as Mr. W. E. Lindsley. I have written to Mr. Lindsley to retract his letter to you hoping that you will correct the same in your paper, as I did not claim to have been indorsed by you.

I remain, yours respectfully,

LEWIS O. HOWELL, JR.,

[Our comments were based entirely on the unauthorized use of our name in a newspaper advertisement. Mr. Howell's letter does not meet the issue.]

LECTURE BEFORE THE MASTER PLUMBERS.

The third entertainment in the course of the Master Plumbers of this city, being a lecture on "The Almighty Dollar," by Rev. William Lloyd, occurred at Steinway Hall, on Tuesday evening of last week. The large hall was almost filled by an appreciative audience, which expressed its approbation by frequent bursts of applause. The lecturer said he addressed his hearers not as a minister but as a fellow workman. From childhood he had known what hardship and poverty meant. A glimpse of his own early life when, after toiling hard all day in an English mill, he studied with greater zeal far into the night to educate and lift himself above his fellows, drew the closest attention of his audience. The lecture was a plain, forcible talk on money, its value, use and abuse, interspersed with a few laughable anecdotes which kept his hearers from weariness and in the best of humors.

The next lecture will be on February 6, by James C. Bayles, editor of *Iron Age*; subject: "No. 26 Daydream Avenue."

PLUMBING LAW VIOLATIONS.

Four cases were given to the attorney, but no new cases of a serious nature were reported last week. Minor violations were reported as follows: By Inspectors Eagleson and Hooper two each, and by Inspector Hollick one.

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The sixth volume of THE SANITARY ENGINEER includes the 27 issues from June 1 to Nov. 30.

The following are a few of the many articles of permanent interest:

Illustrated descriptions of the plumbing work in the well-known residences of Messrs. Wm. K. Vanderbilt, Cornelius Vanderbilt, Ex-Gov. Samuel J. Tilden, John Sloane. Also of the "Mills Building" (the largest office building in New York) and Minot, Hooper & Co.'s Commercial Buildings. A Russian Bath Establishment in Boston and the St. James Hotel in Baltimore.

"Berlin Sewerage." An elaborate report of the system just completed, with illustrations. By M. A. Durand-Claye, Engineer-in-Chief of Bridges and Roads of Paris.

"Trap Syphonage." Report with illustration of experiments for National Board of Health. By Edw. S. Philbrick and E. W. Bowditch. Also by Col. Geo. E. Waring, Jr. Also in England by S. S. Hellyer, Esq. Interesting and valuable data.

"Coverings for Steam Pipes." Results of Some Experiments. By Mr. M. J. Bird.

"The Health of Boys' Boarding Schools." By D. F. Lincoln, M.D.

Weekly "Mortality Returns" of the leading cities in the United States, with "Notes and Abstracts" from reports of Health Officers and correspondents of the National Board of Health. There have been printed each week beginning with issue of Oct. 12.

"Tin in Canned Fruits." By Prof. Albert B. Prescott.

"Negro Mortality of Memphis." By Dr. G. B. Thornton.

"Pullman Sewerage." Abstract of paper describing it. By Benezette Williams, C.E., Engineer in charge.

"Letters to a Young Architect on Heating and Ventilation." By Dr. J. S. Billings, Surgeon, U.S.A.

A model plan for an "Improved Tenement for Working Men in New York."

"Burning of Town Refuse at Leeds. A paper by Chas. Slagg, Assistant C.E.

"The Relative Uses of Gas and Electricity." By C. Wm. Siemens, F.R.S.

"Heat, House Plumbing and Mortality." By Lewis M. Leeds.

"The Management of Heating Apparatus." By Edw. S. Philbrick, C.E.

An extract from a paper by S. S. Hellyer on the "Unsealing of Traps by Momentum"—interesting in connection with experiments made by Messrs. Philbrick and Bowditch, and Col. Geo. E. Waring.

"Water Waste Prevention."

"Regulation of Exeter Water Works." A paper by Geo. I. Deacon, M. Inst. C.E., read before Society of Arts.

"Report of Boston Committee," and report of results in Cincinnati.

"The Massachusetts Law to Prevent the Adulteration of Food and Drugs."

"Notes on Prosecutions in Great Britain."

Practical articles on "Steam Fitting and Steam Heating," by "Thermus."

An illustrated article describing the "Accommodation for the Foreign Cattle Trade" at the port of Liverpool. By Francis Vacher, M.D.

Plan of "Flush Tank for Country Residences."

"Text of the Illuminating Oils Bill for New York State."

"The Effect of Water Level on Disease." By Baldwin Latham, M.Inst., C.E.

"A Form of Specification for Steam Fitting of an Eight Story Apartment House."

"Report on Oil Testers."

An article on the "Sewerage of Brighton, England." With reports by Sir Joseph Bazalgette and J. Bailey Denton.

A series of papers on "Water Analysis," from the *Analyst.*

"Lead Poisoning." By Dr. Edw. S. Wood, Harvard Medical College.

In addition to the foregoing, there are answers to a great variety of questions on the various topics treated by THE SANITARY ENGINEER, the usual record of patents granted and the weekly reviews of questions of current interest to sanitarians, and of the condition of the Gas and Electric Light Industries. This latter feature makes the paper of real value to inventors, since the aim is to state the facts without bias for either interest. Price, bound in cloth, $3. Postage 40 cents. P. O. Box 3037. THE SANITARY ENGINEER. No. 140 William St., New York.

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CASH CAPITAL,	$3,000,000 00
Reserve for Unearned Premiums,	2,116,832 00
Reserve for Unpaid Losses and Claims,	317,596 01
Net Surplus,	1,774,061 06
CASH ASSETS,	$7,208,489 07

J. H. WASHBURN, Secretary.

SUMMARY OF ASSETS.

Held in the United States available for the *Payment* of *Losses* by *Fire* and for the protection of Policy Holders of *Fire Insurance.*

Cash in Banks,	$ 178,463 32
Bonds and Mortgagnes, being first lien on Real Estate, (worth $2,786,800)	1,1 2,737 44
United States Stocks, (market value),	4,308,710 00
Bank and Railroad Stocks and Bonds, (market value),	847,887 50
State and Municipal Bonds, (market value),	20,000 00
Loans on Stocks, payable on demand, (market value of Collaterals, $687,276.24)	491,375 00
Interest due on 1st January, 1883,	42,395 10
Premiums uncollected and in hands of Agents,	103,136 44
Real Estate,	43,784 27
Total,	$7,208,489 07

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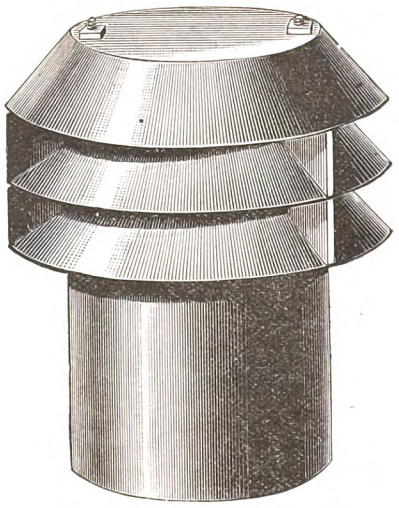

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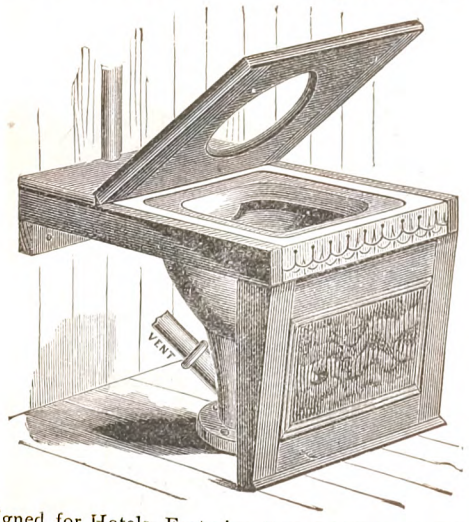

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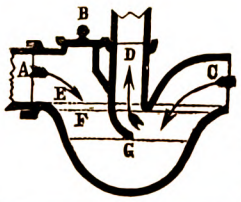

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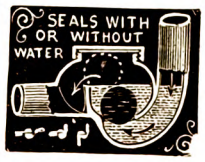

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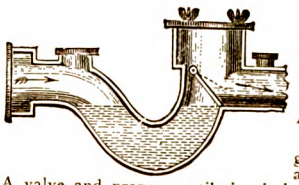

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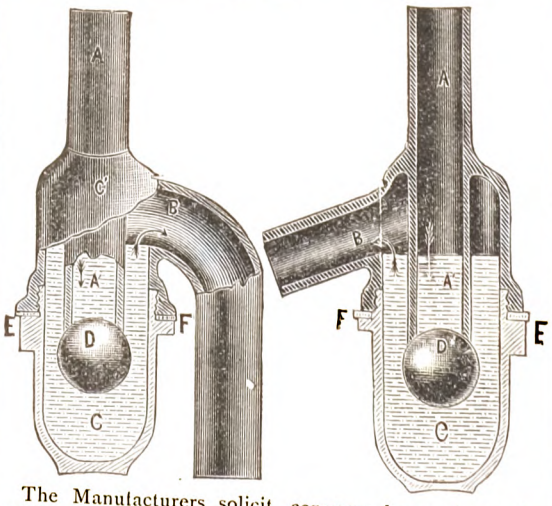

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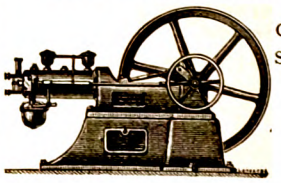

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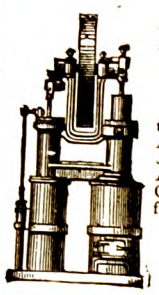

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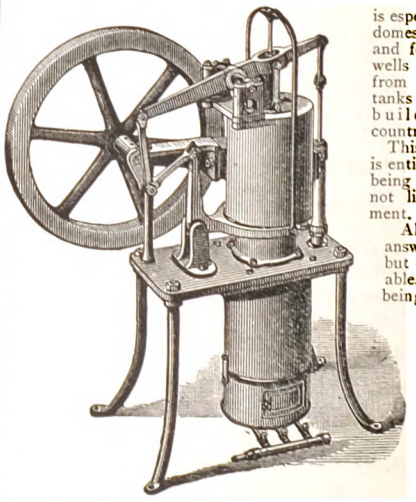

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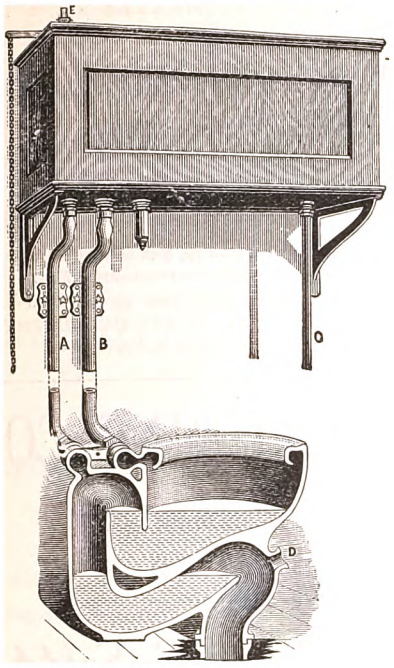

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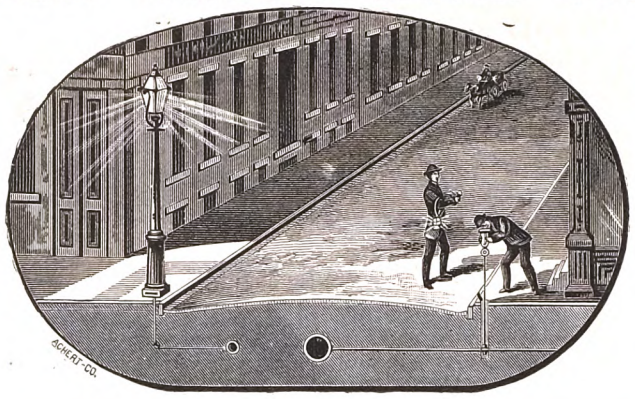

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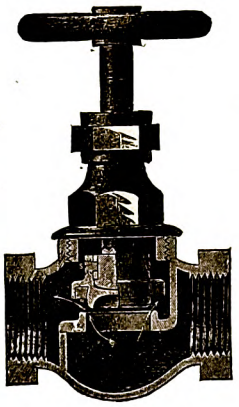

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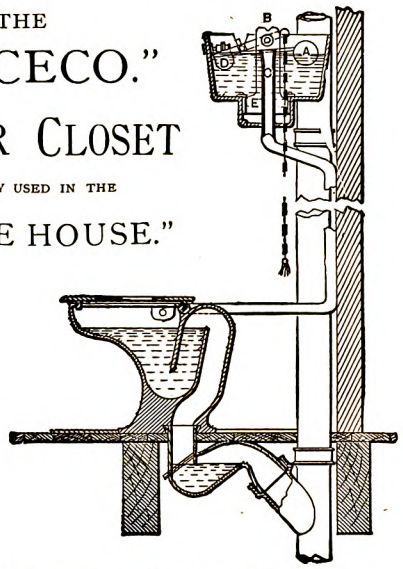

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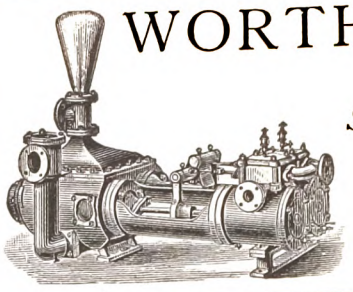

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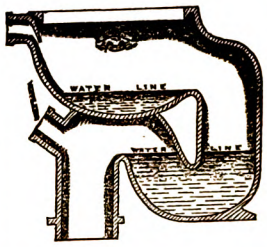

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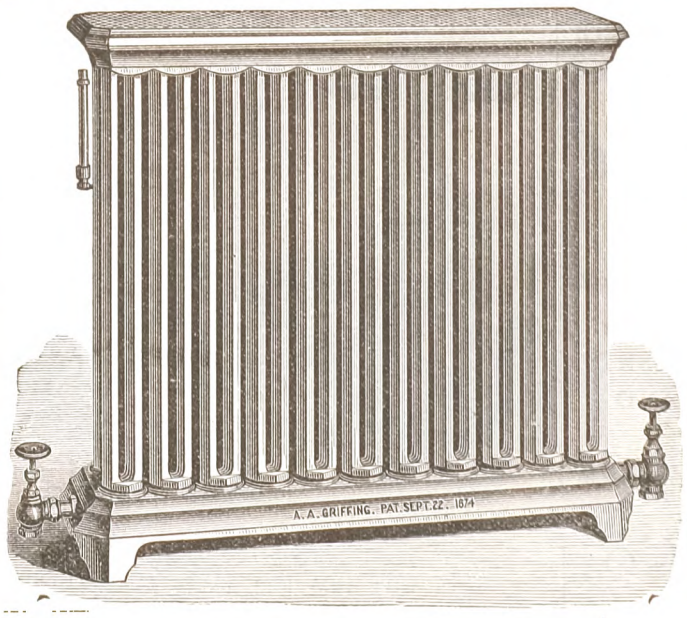

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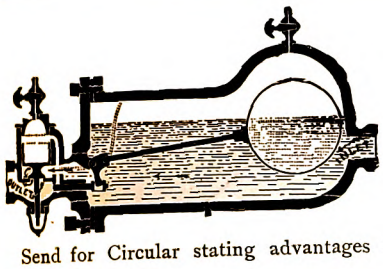

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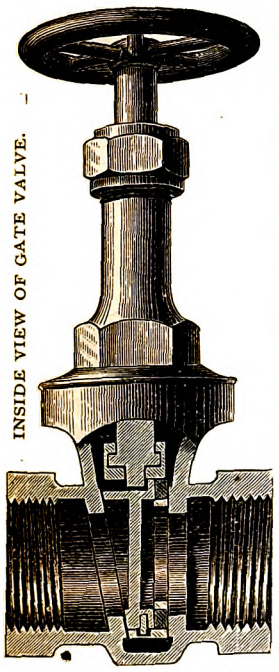

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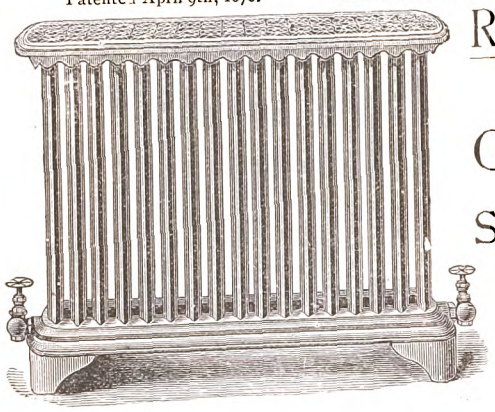

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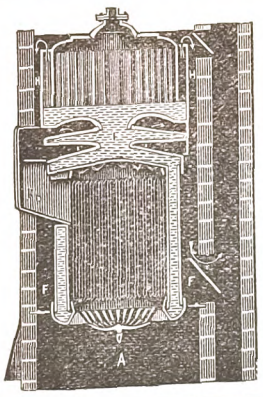

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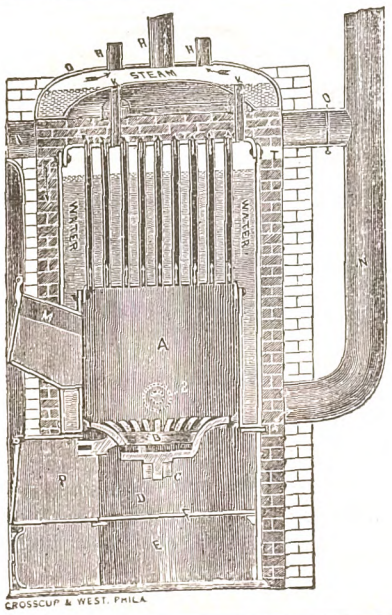

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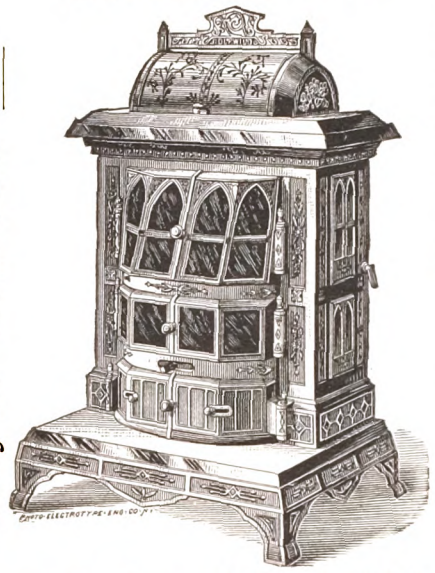

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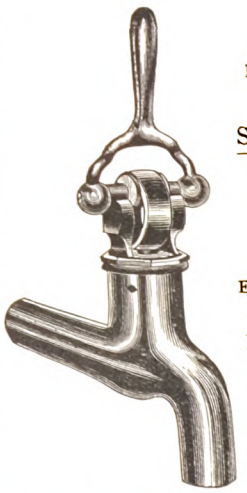

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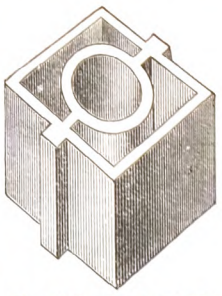

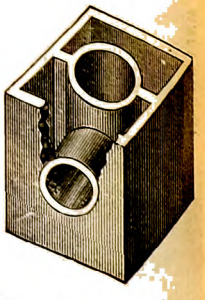

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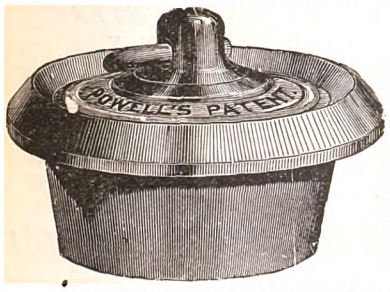

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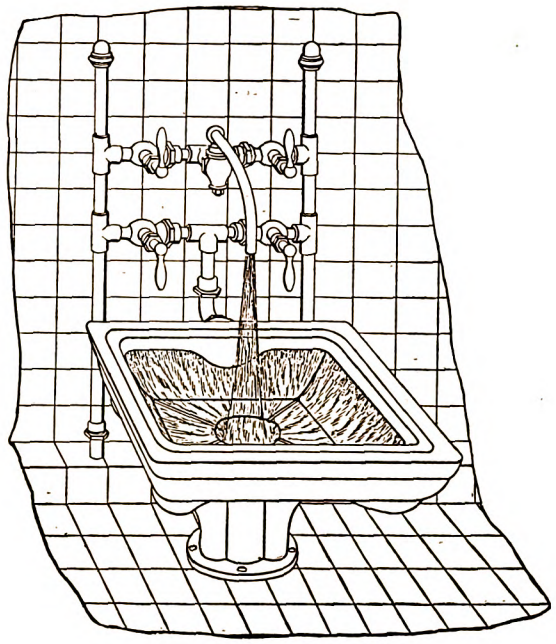

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THE MASSACHUSETTS STATE BOARD OF HEALTH, LUNACY AND CHARITY.

The Boston *Herald* of Jan. 14 contains a long reply by Ex-Governor Talbot, Chairman of the State Board of Health, Lunacy and Charity, to the criticisms on that Board contained in Gov. Butler's recent inaugural address. Mr. Talbot thinks that the Board is all that it should be and is a great improvement over the system which it superseded, and complains of the hostility of the medical profession to the present Board, and especially of the conduct of some physicians, who, he says, accepted office under the new Board while really hostile to it and planning its overthrow. He sneers at medical men as being "theorists in sanitary affairs whom it was not the design of the State to encourage, and gives figures at great length to prove that the charities of the State are economically administered under the present arrangement. The paper is a shrewd attempt to avoid the real issue, somewhat on the cuttle fish plan, and as Mr. Talbot is the man who is responsible for the formation and subsequent operations of the present conglomerate board it is natural that he should rise in its defense.

The precise motives which induced Gov. Talbot, during his term of office, to work for the consolidation of the State Board of Health, which then had the highest repute of any similar Board in this country, with the Lunacy and Charity Commissions, and subsequently to take office in the conglomerate board and retain control of it, are, of course, unknown. The old Board had been charged with duty of looking after purity of the water supply of Boston, and was beginning to take some steps with regard to the pollution by sewage and refuse manufacturing products of rivers in the State. Gov. Talbot had extensive manufacturing interests which might have been interfered with, had the Board continued in this line of work, but under the conglomerate board no steps have been taken which need cause him any apprehension lest he might have to incur some increased expense to dispose of the waste from his factories in such a way as not to foul the water supply of other citizens of the State.

It was also fortunate for the party interests that the consolidation made it possible to give an office to one or two men who might have been troublesome if not thus provided for.

All of which shows how necessary it is to take commercial interests into consideration in attempts to regulate sanitary matters.

It is not at all likely that the present Board under Mr. Talbot's skillful guidance will make itself unpleasant to anyone, except possibly to those citizens who wish to have their wealthy and powerful neighbors prevented from poisoning their water, air and food; but, of course, everybody in this world cannot be satisfied. Mr. Talbot's watchful care even goes so far as to prevent as far as possible any publication by the conglomerate which might tend to cause dissatisfaction or alarm by calling the attention of the public to nuisances.

It will be seen that we have the highest respect for Ex-Gov. Talbot's tact and far-sightedness. Whether it will prove more than a match for Gov. Butler's way of doing things remains to be seen.

NEW YORK'S WATER SUPPLY.

No. I.

THE SUPPRESSION OF WASTE.

The condition of New York with reference to its water supply has frequently been referred to in THE SANITARY ENGINEER during the past three years, and the situation of Boston, Philadelphia and Cincinnati, to mention no smaller places, has suggested the propriety of reviewing the experiences of other cities in their attempts to husband their resources in the matter of water supply. We have for some years looked into the question of water waste prevention, and during the past summer have spent considerable time in investigating the methods adopted in the cities of Great Britain, with a view to being able to form an intelligent opinion as to the best practicable methods that might be employed in New York, making due allowance for the great difference in local conditions, as to the habits and requirements of water consumers and the methods of municipal administration. Briefly stated, the condition of New York is as follows: The Croton aqueduct began delivering water to this city to its fullest safe capacity ten years ago. That capacity was about ninety-five million gallons daily. To furnish this amount of water the flow line in the aqueduct has been maintained at a point nearly two feet higher than the designers and constructors of the aqueduct anticipated when it was built. The strain occasioned thereby has therefore been a matter of deep solicitude on the part of the engineers whose duty has been the maintenance of the conduit.

During the past ten years the population of this city has increased about three hundred and ten thousand. Manufactures, hydraulic elevators and other demands upon the limited amount of water have multiplied at an enormous rate, and no doubt faster than all has the waste increased.

Besides all this, during the fall of 1881 it was made painfully apparent that the storage capacity of the Croton reservoir was inadequate, and while in ordinary times the flow over the dam into the Hudson averaged during the past eighteen years three hundred thousand gallons daily, yet this average was of no avail in a period of extended drought. From the opinions of the ablest hydraulic engineers in this country it is evident that the present Croton water shed is ample for the present and future needs of this city, provided,

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however, that additional storage capacity be arranged for and an additional conduit be provided to carry the water to this city.

The plan proposed by Messrs. Newton and Chesbrough and endorsed by Messrs. Jervis, Francis, Martin, and others, has been fully described in THE SANITARY ENGINEER and need not now be discussed. The carrying out, however, of their recommendations involves a work of such magnitude and an expenditure of so large a sum of money that the desire of political parties to have a hand in it is a natural consequence under our methods of popular government, and until politicians are satisfied in some way or other, the work can neither be begun nor completed. That is the issue and it might as well be realized first as last. The question then remains—under what party and under what conditions can the work be executed and the needless expense be restricted to a minimum amount? To this task the public spirited and intelligent taxpayers of this city should address themselves and endeavor to secure for the citizens of this metropolis the water that must be had, and on as favorable terms as a compromise between political demands, intelligent design, honest and prompt construction will admit of.

As these questions are beyond the scope of the following articles, we shall confine them to the description of methods by which present and future suffering can be mitigated, and that is nothing more or less than the prevention of waste, for even should the work of building a new aqueduct be begun at once, it will probably be seven years before an additional gallon of water can be delivered through it; meanwhile the probabilities of suffering are not pleasant to contemplate.

The consumption of water in New York with the present reduced pressure in the mains is about 75 gallons daily for each inhabitant, which amount is nearly three times as great as Liverpool and Manchester use with their greatly increased pressure. There is no doubt that after making the most liberal allowance for the difference in the habits and usage of our people, fully 40 gallons per head are wasted, and of this amount 25 gallons at least may be considered as preventable waste.

At the ratio of increase of population during the past ten years, another seven years will add two hundred thousand to our numbers, which means a decrease of nearly one-fifth in the water pressure now maintained.

It is obvious, then, that in order to supply the demands of this increased population and retain the present inadequate pressure, one-fifth of the amount delivered or about twenty-million gallons daily must be saved from the amount now wasted, and it is a matter much to be regretted that so little has yet been done in that direction.

In subsequent articles, therefore, it is proposed to describe the experience in other cities and to point out how much yet remains to be done, here and elsewhere, to use to the best advantage what we now have. [TO BE CONTINUED.]

Mayor Edson's commission of business men to inquire into the best plan for improving the water supply of New York is busily engaged in listening to the schemes of projectors, most of whom have a keen eye for business. The *Evening Post* published a *resumè* of the principal projects which it has been proposed to bring before the commission. None of them are new, and some of them are venerable, having been proposed and rejected over and over again for the last fifty years. But they are urged by practical men, who agree with the President of the Dock Department, that engineers "ain't no use, anyhow." The fine disregard of conventionalities which characterize this business men's commission was displayed at one of the meetings by a commissioner offering to take $100,000 of the stock of a company to carry out one of the projects, and this, too, when he had only heard one side of the question, and had not the remotest conception of the arguments on the other side, or the reasons which had so far proved sufficient to deter capitalists from carrying it out. We do not propose to discuss the question of propriety involved in the making of such remarks at this stage of the proceedings, but if one of the commissioners is going to pledge himself to put up a stake on a separate plan, there will have to be another committee appointed to arbitrate between the commissioners. There are known to be at least five speculative corporations formed on paper, any one of which is willing to take a franchise from the city and guarantee a better water supply. How much that guarantee would be worth after the franchise is obtained, is another question. The property owners in Fulton and John streets know something about guarantees from political corporations. We hope that the commission now sitting may reach a wise conclusion, but we suggest to them that it would be wise, pending their deliberations, to restrain their commercial tendencies and abstain from offering to take any pecuniary interest in any project submitted to them.

A new health ordinance for the city of Montreal is now under consideration by the Board of Health of that city, the length and profusion of detail of which may be inferred from the fact that the synopsis alone of the four hundred and odd clauses of the law occupies three columns and a half of the Montreal *Daily Star*.

From this synopsis, which is so brief as to be in fact little more than an index, it is, of course, impossible to judge of the merits of many of the sections, but most of them appear to be the same as those of the New York City code, which is certainly a good one so far as it goes, when it is enforced.

The proposed ordinance is meeting with some opposition on the ground of economy, and the French element of the city, like that of New Orleans, is opposed to sanitary regulations of any kind, but it seems probable that with some amendments it will become a law.

What a considerable amount of sewer gas is manufactured on the premises. Not all the bad air, foul water, and vile smells are due to plumbing. Yet, when they are observed around the house, they are pretty sure to be referred to anything rather than to the source which is responsible for them—want of care and cleanliness about the household arrangements—and very often the plumber is abused when the censure should fall on the mistress or the maid. The other day, in Philadelphia, five dead rats in a well, and one decaying in the well bucket, satisfactorily explained the bad taste of the water which had alarmed the whole family. Yet these people would doubtless have been the first to talk of leaky drains and soil pollution. There is a moral for housekeepers in the remark of the Chatham street dealer in second-hand clothing. When he came into a Third avenue car, a vile smell attached somewhere to him or the bundle of clothes, and to divert suspicion from his wares, he said to the passengers: "Dot ish not the close vot schmelz, dot ish me."

Now the Tree Planting and Fountain Society of Brooklyn is incorporated, and its officers chosen: President, Mr. John W. Hunter; Vice-President, David M. Stone; Treasurer, Gordon L. Ford; and Secretary, Richard M. Montgomery. The general object is the beautifying of the city of Brooklyn, to be attained through the special means of the planting of trees and the erecting of drinking fountains. Of the beauty of the first, Connecticut, after the patient and vigorous endeavors of Mr. B. G. Northrup, will testify, and so will many other rural communities where public spirit and taste have inaugurated tree planting movements. Of the utility, the never-ceasing crowd about a drinking fountain of a large city, is abundant proof. The Society will issue a pamphlet, we understand, before the spring, which will give plain directions about the best varieties of trees, and the proper way of setting out in the streets of a city. Of all the miserable things and poor among the miseries of a city, most miserable is the uncared for tree, with its roots below the close, stifling pavement of a city street.

To secure sweet milk for the infants of the poor is a difficult matter. It has taxed the authorities to check the sale of skim-milk, and even if this is effectually accomplished, and sweet wholesome milk is bought by the poor, it turns sour in the heated, impure atmosphere of the tenement house. To reach this evil, the State Charities Aid Association, in their last annual report, advocated the maintenance of places in those quarters of the city where most needed, at which pure milk in small quantities can be bought during the entire day. They ask for private benevolent enterprise to start the plan, and express the belief that such places carefully managed would pay expenses.

Mr Emil Kuichling, Assistant Engineer of the Rochester Water Works, has reported some of his conclusions about the causes of the epidemic at Binghamton, N. Y., which the State Board of Health appointed him to assist in investigating. Mr. Kuichling says there have been more than five hundred cases of sickness with mild vomiting and purging. It appears that the water supply of the city is obtained from the Susquehanna river, which has been at very low water for some time. A mile and three-quarters above the pumping works the sewage of the New York State Asylum for chronic insane persons, drains into the river after having been imperfectly filtered through earth. It is the opinion of those who have been engaged in the investigation, that the disease is due to the impurity of the water.

The explosion of a house drain has led to a singular suit just decided in Philadelphia. It involved the relative responsibility of the city, and the houseowner for the condition of the house drains, for the plaintiff, alleging that he had suffered damage by the blowing out of the back wall, the ripping up of floors, and the injury of two persons, brought the action on the ground that the city should so construct and guard the sewers, that an entrance of gas into houses could not take place. In its defence the city pleaded that it had no control of house drainage, and that premises should be trapped against the sewer, and the drain ventilated and soil pipes carried above the roof, but all these precautions had in this case been neglected. In consequence, a leaky gas pipe in the street sent gas into the house drains, and through the drains imperfect joints, it found its way to the kitchen range and exploded with the resulting damage. The result of the action was a non-suit; plaintiff could not recover because of his own negligence in having imperfectly planned drains.

The movement for a plumbing ordinance is progressing in Philadelphia. A meeting of persons interested in sanitary work was held the 16th instant, in conference with the committee on survey. It was decided that plumbers must register, as in this city. The suggestion was indorsed by the plumbers present. A conference committee, consisting of seven plumbers, seven citizens, and seven engineers and experts, has been appointed to prepare the ordinance, and Mr. John J. Weaver has been chosen President and Mr. William Harkness Secretary of the plumbers' section of the committee.

The prizes offered last August by Mayor Low, of Brooklyn, for the best plans for school buildings of moderate cost, have unfortunately attracted little attention from the architects. After several postponements the decision of the committee of award was made known last week, and was opposed to an award at all, for it seems but one plan was sent in—for a $15,000 building—in so incomplete a shape that the committee recommended against the giving of the prize. Mayor Low, however, in recognition of labor spent in preparing the one plan sent in, sent to the author of it the amount of the first prize, two hundred and fifty dollars; and the mayor did right.

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GENERAL STEAM SUPPLY FOR NEW YORK CITY.

THE WORK OF THE N. Y. STEAM HEATING CO.

The following description of the plant of this company has been prepared especially for us by one of our staff, and we trust it will prove of interest to our readers.

The most stupendous undertaking ever contemplated for the production of steam, that has a prospect of success, is that now being put to a practical demonstration in the streets of New York by the New York Steam Co.

The scheme embraces the establishment of some twelve or fourteen stations (named after the letters of the alphabet), to be distributed through the city, and to be erected as the requirements of the districts seem to demand and justify.

The annexed diagrams represent "Station B," which is situated on the south side of Greenwich street, between Courtland and Dey streets, and is built on three 25-foot lots—Nos. 170, 172 and 174.

Figure 1 is the ground plan, and shows the irregular shape of the building; with the foundations for chimneys and piers. Figure 2 is the first story plan, and may be properly said to represent each of the four floors on which the boilers are to be set. Figure 3 is a section about on the line *A' B'*, and shows a view through one chimney on its greatest axis, on a horizontal plane, with an approximate position and setting of the boilers and the floor trussing and columns. Figure 4 is a section on the line *C' D'*, showing a chimney on its shortest horizontal axis; and Figure 5 is the façade, whose principal feature is the immense opening in the brickwork (*j*), which extends from almost the roof to the water table, and which is fitted with portable or easily moved sections, to allow for the ingress and egress of heavy machinery.

The positions marked *B*, between the columns, are where the boilers are placed; with their fronts and fire doors facing on the fire room *D*. It is intended to have 4,000 *horse power* to a floor, each position between the columns containing 250 horse power, making for the four floors of boilers an aggregate of 16,000 horse power—presumably the greatest in the world under one roof.

The boilers used are the Babcock and Wilcox Water-tube Boiler (see Fig. 6), and there may be said to be two boilers in a nest (between each set of pillars), or to the same fire grate, the horizontal steam and water drums of each being connected by a large cross pipe, virtually making them one boiler.

These boilers are composed of lap-welded wrought iron tubes, placed in an inclined position as shown, and connected with each other, and with a horizontal steam and water drum, by vertical passages at each end, while a mud-drum connects the tubes at the rear and lowest point in the boiler.

The end connections are in one piece for each vertical row of tubes, and are of such form that the tubes are "staggered" (or so placed that each horizontal row comes over the spaces in the previous row). The holes are gauged, and the tubes fixed therein by an expander. These are connected with the drum, and the mud-drum also, by short tubes expanded into bored holes, doing away with bolts, and leaving a clear passage-way between the several parts. The openings for cleaning opposite the end of each tube are closed by hand-hole plates, the joints of which are made by milling the surfaces to an accurate metallic contact. They are said to be tested to 500 pounds per square inch, and to be iron to iron, and to have no rubber or perishable substances between the joints.

In setting the boilers are suspended, and do not rest on the brickwork or fire front, and are set substantially as shown, the fire being under the front or high end of the tubes and the products of combustion passing between the tubes into a chamber under the steam and water drum, then down between the tubes to the back of the bridge-wall, thence up again and to the chimney.

The circulation of the water within these boilers is up through the tubes, where it enters the drum and flows backward and down again to the tubes, giving, it is claimed, extraordinarily good results as a steam maker and preventing, to a great extent, the formation of deposits upon the inside surfaces and allowing all loose substances to settle into the mud-drum.

One of the objects, we are informed, for selecting these boilers for the peculiar situations they here occupy, aside from their high efficiency and the small cubic capacity they occupy for horse power, is their supposed absolute safety from any kind of burst or explosion that would materially injure the building or other boilers above or below them.

We will now follow the water from its entering the boilers through its changes and stages to the consumer and back again to the boilers in the station and describe details as they suggest themselves in that order.

There are no feed water heaters used, the return water, with the steam necessary to force it round its circuit, presumably being sufficient to heat the water necessary to be supplied to make up for the loss caused by steam supplied to engines.

The water enters the boilers before described, where it is converted into steam, thence it is passed through about an 8-inch pipe to about a 18-inch main, *see dotted lines q r*, which runs above and in front of the boilers, through the fire room *D*, and connects with the vertical cylinder *b*, which conveys the steam to the basement, preparatory to distributing it to the street. The main connections from the drums of the boilers to the pipe *r* are partly composed of copper, and are supplied with bends of long radius, to give elasticity to the branch and an easy flow to the steam. Each is fitted with an angle stop valve of special design, the position of the valve being close to the main pipe *r*. This valve, an idea of which can be had from the diagram,

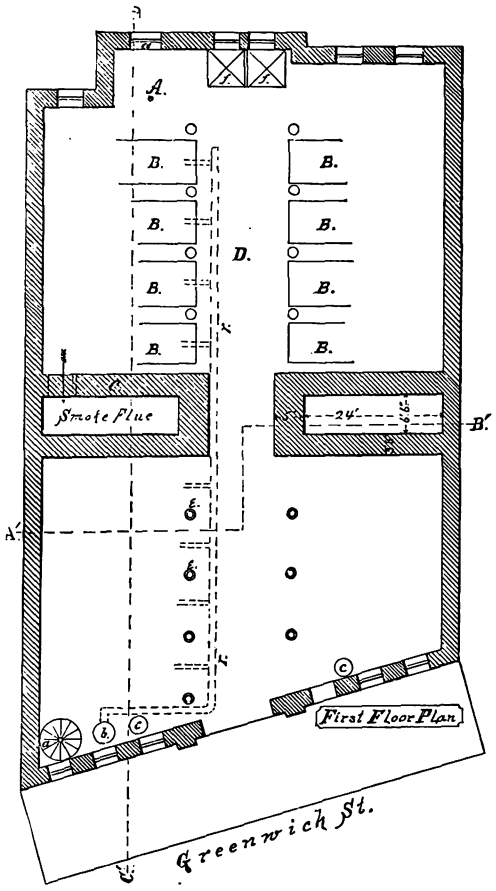

FIG. 2.

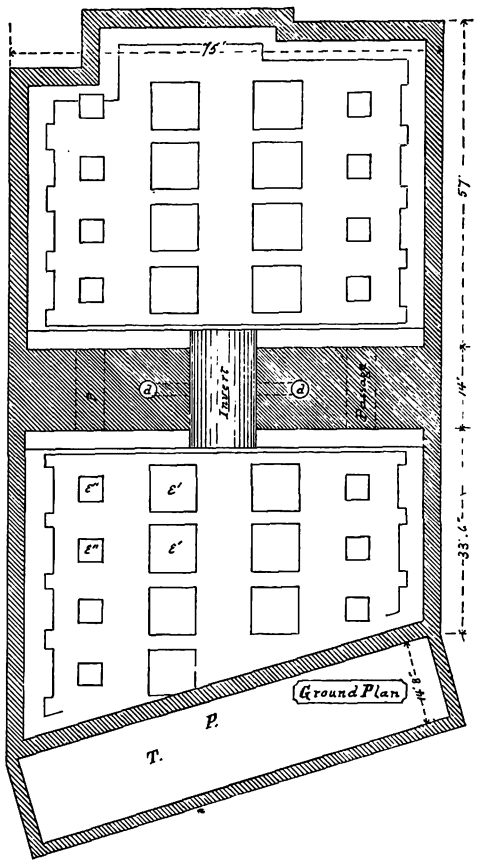

FIG. 1.

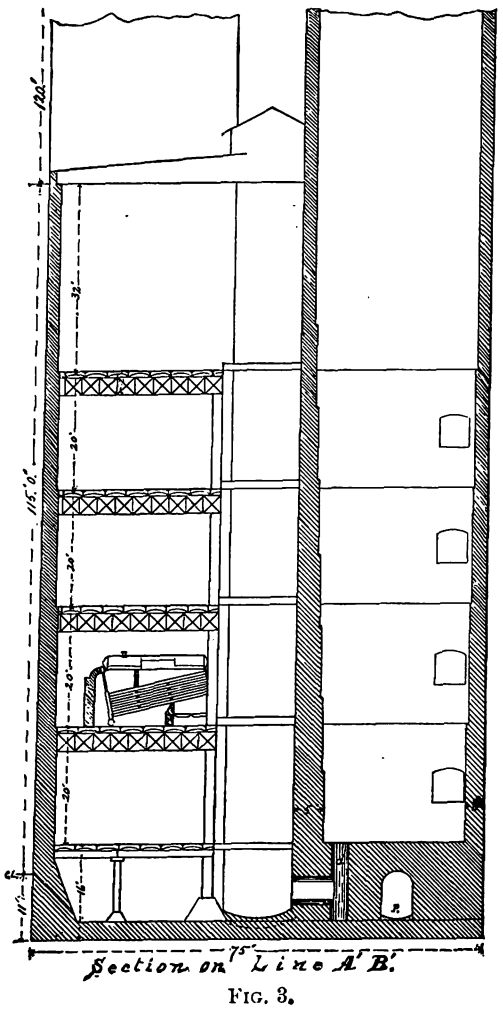

FIG. 3.

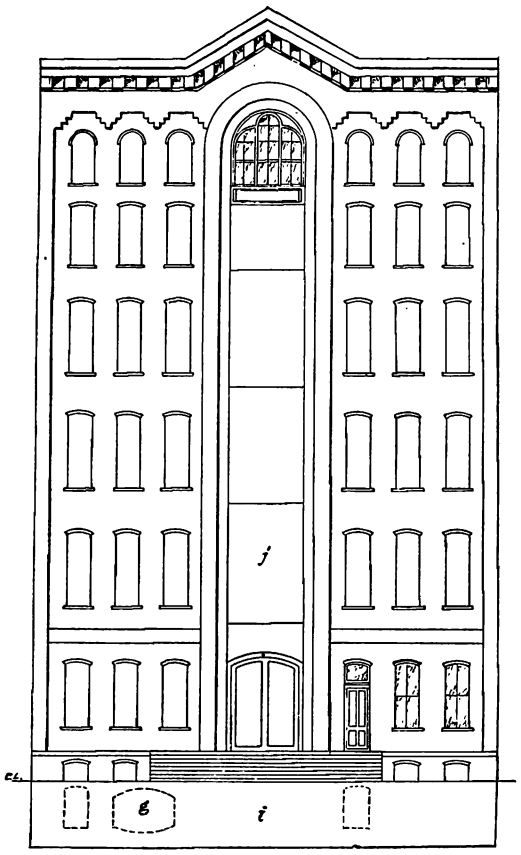

FIG. 5.

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Fig. 7, is to prevent the steam from the whole system flowing backward and escaping through one boiler, should any part of it give out. It is a combined stop and check valve; the steam from the boilers as it passes into the general system having to force its way under the disk which it raises, but which would be instantly thrown down, checking a back flow from the main if the bursting of a tube caused a difference of pressure between the main and one boiler.

From the bottom of the cylinder *b*, which is 3′ 6″ in diameter and into which the main horizontal pipe from each floor connects, steam is distributed to the mains in the street by large branches which lead off in different direc-

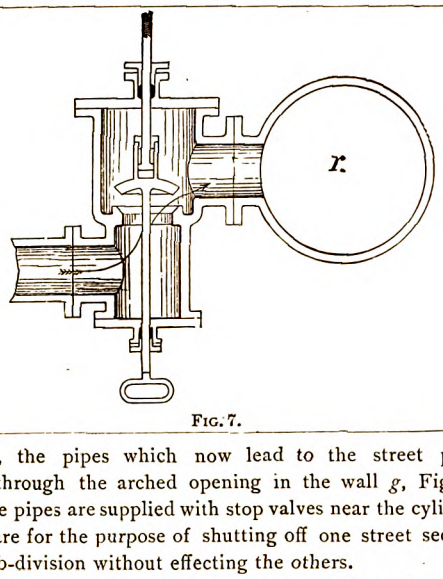

FIG. 7.

tions, the pipes which now lead to the street passing through the arched opening in the wall *g*, Fig. 5. These pipes are supplied with stop valves near the cylinder and are for the purpose of shutting off one street section or sub-division without effecting the others.

The largest pipes laid in the street are fifteen inches in diameter and run down to about eight inches and are wrought iron lap welded tubes, in lengths of about twenty feet, with flanges on their ends and bolted together. The flanges are what is commonly known as "flange unions" and are faced true and brought together on a cocentrically corrugated copper gasket, nothing but a lead paint being used to form the joint.

The pipes are not screwed into the flanges in the ordinary way, but are inserted and expanded in the same manner as a boiler tube; a groove being made on the bore of the flange, into which the metal of the end of the pipe is pressed by a Dudgeon expander.

[TO BE CONTINUED.]

MALARIA

BY GEORGE M. STERNBERG, M.D., SURGEON U. S. A.,
Late Member of the Havana "Yellow Fever Commission" of the National Board of Health, Cor. Member of the Epidemiological Society, London; F. R. M. S., etc.

No. III.

We have seen that malarial fevers must be due, directly or indirectly, to the action of bacterial organisms, as they result from a miasm—malaria—evolved during the decomposition of vegetable material. And vegetable decomposition is due to the action of living ferments. These living ferments—malarial germs—can scarcely fail to find their way into the atmosphere in the neighborhood of marshes and malarious soils. Indeed, we have ample evidence that the germs of a variety of bacterial organisms are constantly present in the atmosphere, and there is no reason for supposing that these form an exception in this regard, although, according to our belief, no *specific* malarial germ has yet been demonstrated. Being in the atmosphere they must find entrance to the bodies of those who respire this atmosphere. But not necessarily to the blood. The atmosphere constantly contains putrefactive organisms, and a sterilized organic fluid exposed to unfiltered air quickly undergoes putrefaction, when the temperature is favorable. But the blood of animals respiring this atmosphere does not putrefy, although a very putrescible liquid, either within the vessels of a living individual or in a sterilized flask placed in a culture oven, if it be introduced into this flask directly from the circulation, with precautions which prevent contamination by atmospheric germs. What then becomes of bacterial organisms which are introduced into the respiratory passages during the act of inspiration? The moist mucous membrane which lines these passages is a germ-trap which arrests floating particles of all kinds. Those which are deposited upon the membrane lining the buccal and nasal cavities find their way into the stomach, or to the spittoon and pocket handkerchief—not always; while those which enter the bronchial tubes are doubtless deposited before reaching the smaller ramifications of these tubes or the air-cells at their extremities. By the action of the cilia of the epithelium, covering the bronchial mucous membrane, these particles, of whatever nature, are constantly carried back toward the entrance of the bronchi. We have here an admirable provision of nature for preventing germs from gaining access to the blood by way of the lungs. That it is always efficient is not claimed. But that suspended particles in the air are more likely to find their way into the alimentary canal than into the blood by way of the lungs is undoubtedly true. As a matter of fact we find, in healthy persons, that saliva, or mucus from the mouth or nares, contains an abundance of bacteria of various species, and that the discharges from the bowels also contain a multitude of these minute organisms, which evidently multiply within the body at the expense of the organic material ingested as food.

There can be but little doubt that the chemical products evolved during the active growth of these living ferments, within the body, are the same as those produced external to it, in the cesspools, or marshes, which are the normal habitat of some of them. If, then, these products are poisonous, it is not improbable that the poison factory may be either within or without the body.

Fortunately these foreign germs do not find in the intestine of man and the lower animals conditions as favorable to their continued development as those which exist in their native cesspools and marshes, and one infected with them may often withstand their effects, if in vigorous health, when they do not receive constant reinforcements from without.

This hypothesis furnishes an explanation for the fact that after exposure in an intensely malarious atmosphere the symptoms of malarial poisoning are sometimes developed almost immediately, from a toxic dose of the poison? And also of the fact that, in other cases, the characteristic febrile paroxysm does not occur until some time after exposure—period of incubation, or time for development of germs and poisoning from within (?)

Whatever may be the true explanation of the *modus operandi* of the malarial germ, or germs, *i. e.*, the organisms which constitute or produce malaria, it is evident that the *biological factor* demands especial attention in future investigations relating to the nature of malaria. And no explanation of the occasional epidemic prevalence of malarial diseases in sections previously free from them is likely to be satisfactory, unless this element of the problem is duly considered.

It is claimed by some epidemiologists, and apparently upon reliable data, that malarial epidemics commonly precede or follow epidemics of other diseases, and particularly of influenza, cholera, dysentery and plague. In Europe it has been noted that influenza and malaria rarely prevail extensively, at the same time, but that an epidemic of the former disease is very commonly followed by one of the latter. Malarial fevers and dysentery, however, may occur simultaneously both endemically and epidemically, and, indeed, the two diseases may be associated in the same individual.

The mortality in the entire United States from malarial fevers, during the last census year (1880) was: males, 10,276; females, 9,985; total, 20,261, giving a proportion of 27.61 per thousand of all deaths from reported causes.

In the North Atlantic region (Grand Group I.) the proportion of deaths from malarial fever to all deaths recorded was 4.56 per thousand. *In the Lake region* (Grand Group VII.) the proportion was 9.74 per thousand.

In the Gulf States (Grand Group IV.) the proportion was 65.85 per thousand, or more than fourteen times as great as in the North Atlantic region.*

These figures fall far short of showing the mortality caused by malaria. For many of the victims of this widely-spread poison do not die directly from malarial fevers, but succumb to organic visceral maladies resulting from repeated attacks of intermittent fever, or to other diseases which prove fatal because the vital resistance of those attacked by them is at a low standard from chronic malarial poisoning.

If, instead of mortality only, we could have figures showing the total amount of sickness produced in the United States by malaria, and the total annual loss to the country from this tax upon labor, which is levied upon the health and strength of the laborers, we would be astonished at the enormous amount of suffering, and at the pecuniary loss represented.

The question, What is Malaria? is, then, one of national importance, and sanitarians should unite in the demand

* Figures obtained from the *Medical News* of Nov. 25, 1882.

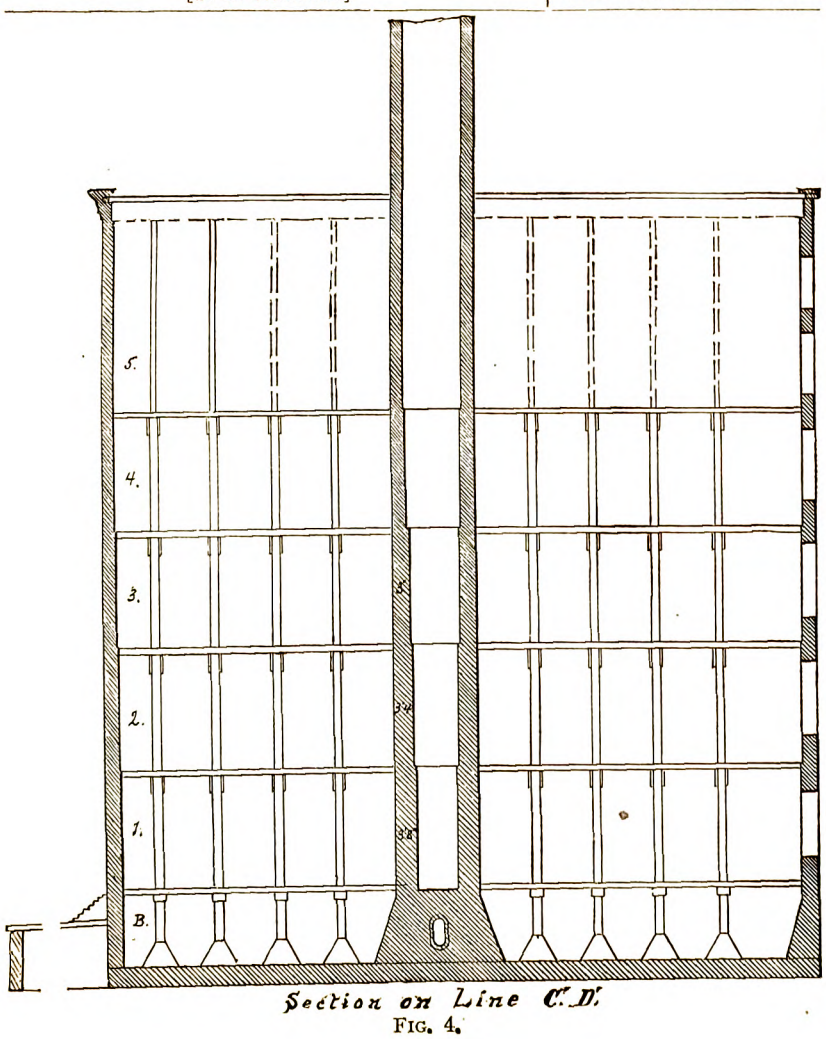

FIG. 4.

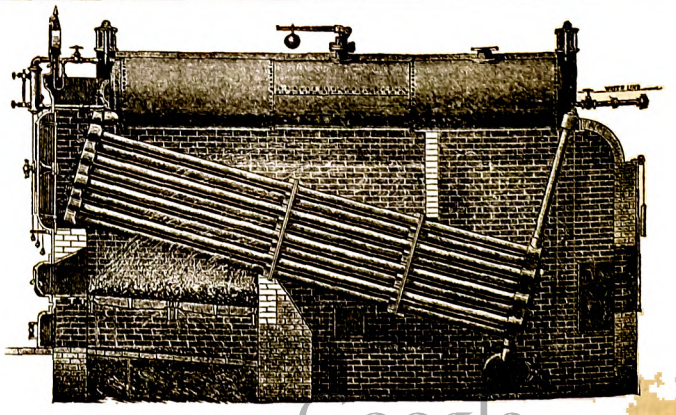

FIG. 6.

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that properly directed investigations be undertaken by some branch of the government service, and continued, with all the facilities required, until it is finally answered.

It is evident that in such an investigation the greatest prominence should be given to biological studies relating to the micro-organisms present in malarious waters and soils, in the atmosphere of malarial localities and in the bodies of those suffering from malarial poisoning. But an intelligent search for malarial germs in any of these situations can only be made by one who is already familiar with the bacterial flora of organic infusions, of non-malarial atmospheres, and of the healthy human mouth and intestine. For "germs" which do not produce malaria are found in great variety in all of these situations, and a thorough knowledge of the morphology, physiology and life histories of these harmless organisms is the only safeguard against the *pseudo-discoveries* which have done so much to retard the progress of science.

Modern methods of research enable us to isolate bacterial organisms, and to obtain "pure cultures" of various species for microscopical observation, and for experimental purposes. If these methods were applied to the study of all the species found as harmless parasites in the alimentary canal of man and the lower animals, we would be better prepared to recognize "disease germs" in these situations and to trace them from the infected individual to their source.

In an experimental investigation relating to the etiology of malarial fever, one of the first steps should be to verify the truth of the statement that certain animals—horses, cows, dogs and hogs (Hertz, in Ziemssen's Cyclopædia)—are subject to the disease. If this be found to be true, the most susceptible and available animal should be selected, and pure cultures of various organisms obtained from malarious atmospheres and waters should be administered *per orem*, rather than subcutaneously, as in the experiments of Klebs and Tommassi-Crudeli upon rabbits.

The limits of the present article do not permit of a more extended account of the geographical distribution of malaria; of its apparently erratic epidemic prevalence in the New England States at the present time; or of the methods of research, upon which we must depend for a final answer to the question asked at the outset, and which we should continue to ask by the experimental method until a definite answer is obtained, viz.: *What is Malaria?*

SIMPLE METHODS OF SECURING PURE AIR.

Some simple methods of using the common stove for ventilating rooms are described by Dr. D. F. Lincoln in his paper on "School Hygiene," which is printed in the Second Annual Report of the Board of Health of the State of New York, for 1881 and 1882.

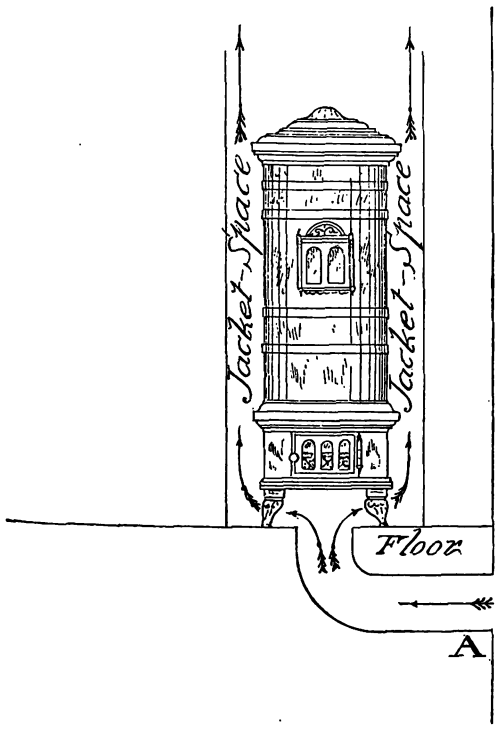

FIGURE 1.

In a variety of ways, Dr. Lincoln says, the stove or stove pipe can be used to expel air from the room. The "jacket" or metal screen is a thing of which no stove in an inhabited room should be destitute, as a protection from heat. But it is mentioned here as affording an aid to ventilation. Figure 1 shows how this is done. A metal cylinder, considerably wider than the stove, is placed around the latter, and its edge is fastened to the floor. A good sized pipe is then carried through the floor, under the stove, and led through the house wall at *A*. Guard the inlet with a screen of wire at *A*, and a large supply of pure warmed air is drawn into the room. This is one of the cheapest and best devices for warming and ventilating. Some prefer to extend the jacket around only a part of the stove and leave the door uncovered; or the jacket may stop at the bottom of the stove and be made fast to the latter at that point. The arrangement is equivalent to a "portable furnace," such as is usually placed in a cellar or a basement hall.

In Figure 2 a stove is represented standing close to an open window. The movable semicylinder of metal, commonly used for a screen, has been so placed as to enclose the stove on all sides, except that towards the windows.

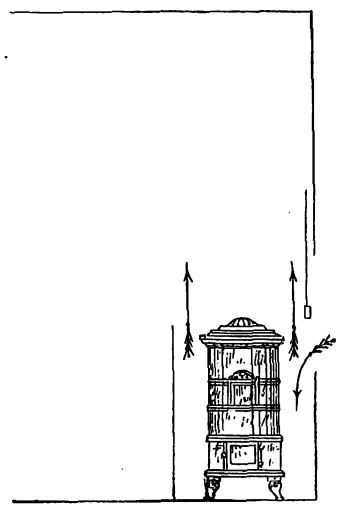

FIGURE 2.

Cold air may then be freely admitted; it is quickly warmed by contact with the stove and is thrown upward with the general current.

Figure 3 shows air brought in so as to be warmed by contact with a stove pipe. The inlet flue is enlarged and runs up with the stove pipe, like a jacket, for same distance.

Figure 4 shows how a stove pipe may assist in removing injurious air. The diagram represents a two-story house with a chimney which comes down to only a very short distance from the roof. The opening into the chimney for the stove pipe is enlarged so as to receive a much larger pipe,

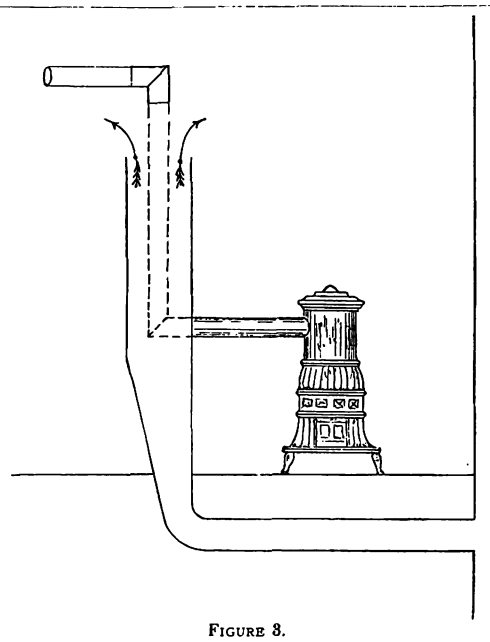

FIGURE 3.

which encircles the stove pipe like a jacket. This jacket may stop short at *A*, or may be carried through the floor to *B*, in the first story. It will secure a draught from either story as may be arranged. The idea of this and the preceding figure is borrowed from an article in the report of the Michigan Board of Health for 1879.

A chimney, into which a smoke flue discharges, may be opened at any point *below*, and not too near, the point where the smoke enters. Many rooms, for instance, have chimneys which reach to the floor, while the stove pipe enters near the ceiling; such chimneys ought to lend their powers to the task of ventilating the room by an opening near the floor. The latter ought to be closed when the fire is making.

The term "aspiration" is applied to the suctional force of heated flues. The method by aspiration has been used systematically in large school houses, making one shaft do the work for the whole house; in which case the room flues are often made in the floor, running across to the brick shaft. In some cases all the flues are made to descend to the base of the shaft before entering it. A discussion of this matter on a large scale is beyond the purpose of this paper. Where the number of rooms is great,

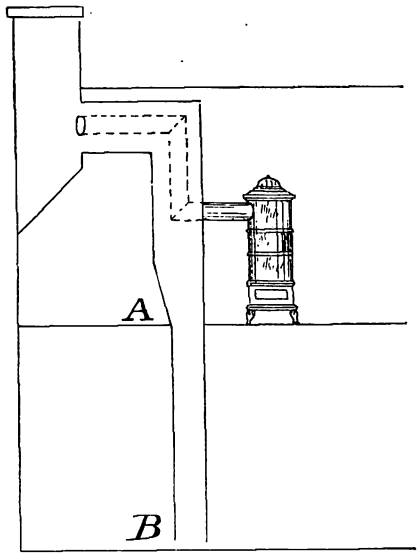

FIGURE. 4

and the exposure to the weather is different in different parts of the building, unequal action is likely to occur.

As regards a heating apparatus, furnaces in cellars are most manageable when standing directly under the rooms they are to heat, or at the windward corner of the house; in other cases they sometimes play strange tricks, refusing to yield warm air, or drawing it out from the room. A steam apparatus has this advantage, that the heat can be placed just where it is needed. Whenever a supply is wanted in a room, a tin pipe (wood should be avoided as unsafe) can be led down from that point to the cellar, and a steam coil put there, encased in a wooden box lined with tin, to save heat, which has a value for stormy weather; but in no case should air be taken from cellars.

Something more should be said of the cellar. It cannot be too often repeated, that the purity of cellar air lies at the foundation of the purity of house air. The danger of severe and sudden illness lurks in cellars as often as in sewers. The common practice in regard to cellars is to bury the drain under its floor, to place water closets in its darkest corners, to store combustible rubbish in wooden bins (I have seen great heaps of paper scraps), to pile away old rotten boards and clothes, to hang children's outer garments in it; in short, there are few uses of a menial sort to which it is not put. The cellar is often without a proper floor, often is very dark and close for want of windows, often is darkened by placing the heater boxes in front of windows.

To these sources of pollution (for darkness is one source) add the fact that in cold weather a powerful outside pressure exists, forcing air into the cellar and thence into upper parts of the house. It is too much to expect that an average cellar will be so pure, so free from all these objectionable things, that air may safely be taken up from it by furnaces for the consumption of the house.

Let the floor be concreted or asphalted, so as to be air and water-tight. Put no drain underneath, unless in a trench with a wooden or stone cover. Put *one* large trap outside of the walls for each sewer, ventilate it by an opening just inside the trap; run the soil pipe up full size several feet above the roof, and protect it from rain; ventilate the trap under each washstand; have no water closets in the cellar; or if they be thought necessary, isolate them in separate chambers of masonry with abundance of light, accessible to the children from the outside only of the house. Give a plenty of windows, and good height, and keep the walls whitewashed.

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ZYMOTIC DISEASES IN NEW YORK CITY.

BY DR. JOHN T. NAGLE,

Deputy Register of Records.

NEW YORK, *Jan.* 10, 1883.

To the Editor of THE SANITARY ENGINEER:

I have the honor to submit the following comparative statement of the deaths from some of the more prominent zymotic diseases, and the number of contagious diseases (reported to the Sanitary Bureau) in the City of New York, during the year ending Dec. 31, 1881 and 1882:—

DISEASES.	Deaths.		Cases of Contagious Diseases Reported.	
	1881	1882	1881	1882
Small-Pox	451	259	1,342	708
Measles	429	913	3,116	4,637
Scarlatina	1,964	2,066	7,338	6,362
Diphtheria	2,249	1,525	5,272	3,507
Croup	1,034	729	.....	.....
Whooping Cough	286	658	.....	.....
Typhus Fever	160	65	568	207
Typhoid "	446	362	965	686
Malarial "	605	540	.....	.....
Puerperal "	53	59	.....	.....
Diarrhœal Diseases	4,270	4,050	.....	.....
Cerebro-Spinal Fever	461	238	556	236
Other Zymotic Diseases	1,083	958	.....	.....
Total Deaths from Zymotic Diseases	13,495	12,422	.....	.....
Total Deaths from all causes	38,624	37,924	.....	.....
Estimated population in the middle of the year	1,242,533	1,279,560	.....	.....
Death Rate per 1,000 of the population	31.08	29.64	.....	.....

By the above table it will be seen that there was an increase in the number of fatal cases of Measles, Scarlatina and Whooping Cough during the year, and a decrease in all the rest of the contagious and infectious diseases. The average age of those who died during the year of Small-Pox, was 15y. 6m. 6d.; Measles, 2y. 4m. 26d.; Scarlatina, 4y. 0m. 21d.; Diphtheria, 4y. 2m. 10d.; Memb. Croup, 2y. 9m. 13d.; Whooping Cough, 1y. 4m. 21d.; Typhus Fever, 39y. 1m. 3d.; Typhoid Fever, 25y. 9m. 2d.; Cerebro-Spinal Fever, 11y. 0m. 28d., and Malarial Fevers, 27y. 4m. 2d.

The residents of tenement houses suffered more from the effects of contagious and infectious diseases than those who dwell in less crowded houses. There is not a single disease of the ten zymotic diseases previously mentioned, where the deaths in tenement houses did not exceed those reported in dwellings which contained less than four families. The following table may prove of interest in support of the above statement:—

DISEASES.	DEATHS.			
	In houses containing less than 4 families.	In houses containing more than 3 families.	In Hotels and Boarding Houses.	In Institutions.
Small-Pox	13	41	1	204
Measles	128	580	4	199
Scarlatina	574	1,412	24	72
Diphtheria	478	978	6	57
Memb. Croup	179	518	.....	36
Whooping Cough	174	447	4	31
Typhus Fever	.....	7	.....	57
Typhoid "	78	132	2	146
Cerebro-Spinal Fever	64	138	3	33
Malarial Fever	202	284	6	47

The total number of deaths for the year was 37,924; or this number 20,096 were males, and 17,828 were females; 24,494 were born in the United States; 13,430 were foreign born; 703 were colored, and 17,520 (9,317 males and 8,203 females) were under 5 years of age. The following is the mortality by ages: Under 1 year, 9,867; between 1 and 2 years, 3,586; between 2 and 3 years, 1,882; between 3 and 4 years, 1,297; between 4 and 5 years, 888; between 5 and 10 years, 1,635; between 10 and 15, years, 505; between 15 and 20 years, 759; between 20 and 25 years, 1,555; between 25 and 30 years, 1,751; between 30 and 35 years, 1,696; between 35 and 40 years, 1,916; between 40 and 45 years, 1,687; between 45 and 50 years, 1,588; between 50 and 55 years, 1,500; between 55 and 60 years, 1,193; between 60 and 65 years, 1,262; between 65 and 70 years, 959; between 70 and 75 years, 905; between 75 and 80 years, 655; between 80 and 85 years, 523; between 85 and 90 years, 207; between 90 and 95 years, 61; between 95 and 100 years, 34; 100 years, upward, 13.

The deaths by Quarters during the year were as follows:—

	Total Deaths	Males	Females
Three months ending March 31, 1882	10,288	5,502	4,786
" " " June 30, 1882	9,618	5,102	4,516
" " " Sept. 30, 1882	10,349	5,440	4,909
" " " Dec. 31, 1882	7,669	4,052	3,617
Total	37,924	20,096	17,828

J. T. N.

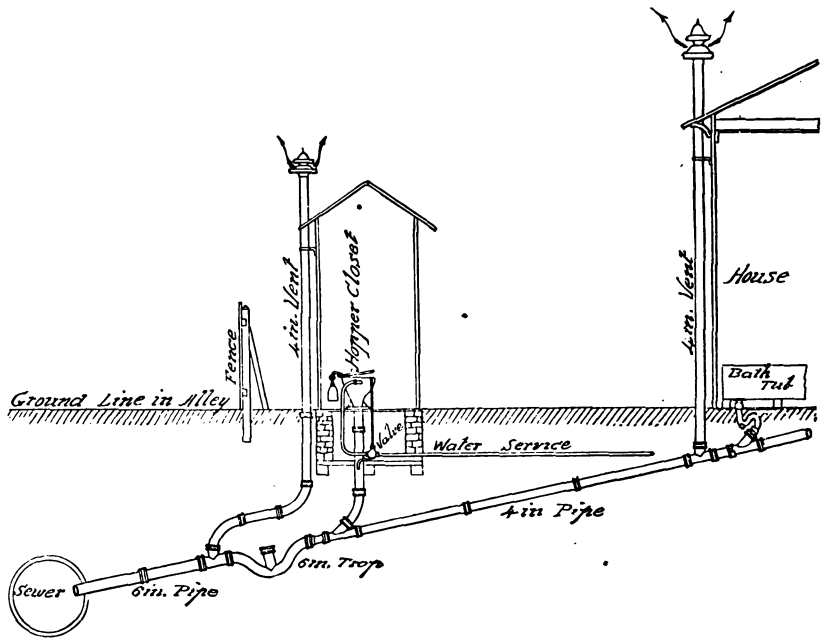
THE TRAP ON THE HOUSE DRAIN.

PUEBLO, COL., *Jan.* 12, 1883.

To the Editor of THE SANITARY ENGINEER:

These cities, Pueblo and South Pueblo, with a population of about 20,000, are, at present, constructing a good system of sewerage, under the management of city engineer J. S. Green, the main trunk sewer of both brick and pipe. They have lateral pipe sewers extending through alleys; therefore the house drainage is through the rear of the house instead of the front, as usual. Partly from prejudice and partly from the mildness of our climate, the people of this city prefer out-door water closets (not all, of course, but the majority,) and the rear drainage system makes this very handy for closets. I use the J. S. Mott self-flushing hopper, with Bartholomew valve placed three feet under closet floor, the waste connected with sewer.

Having explained this part, I will state that my object in writing to you was in regard to an ordinance drafted, I presume, by our city engineer, prohibiting a running trap on the main house drain, requiring to run the soil pipe untrapped through the roof. Now, I have no objections to this for new work or work overhauled and properly reconstructed, but nearly all the plumbing work in this city has no soil pipe above the highest fixture, which is generally on the first floor, and the owner is either unwilling or unable to make this change, so I have substituted for this kind of work something like the plans sent you in this letter. But still the engineer objects to the trap, and calls it a hot bed of disease, but does not recommend anything better. There is now work awaiting your decision, whether this trap is proper or not. The work I have already constructed of this kind gives excellent satisfaction. Now, these plans relate only to this kind of plumbing; without soil pipe above roof.



If you can spare room in your valuable paper to print this and reproduce the cut, if correct, and state your objections, if any, you will confer a benefit on this community, and a subscriber. Yours, very respectfully,

DOUGLASS MITCHELL.

P. S. Please state whether a large grease trap in the yard is now considered necessary for ordinary kitchen drainage?

[Under the circumstances you name it would be criminally stupid to remove the trap between sewer and house; it is equally so to permit any soil pipe to terminate inside a house. The least that can be done is to insist that every such pipe shall be at once extended through the roof. Unless your public system of sewers is in better condition now, and likely to remain so, than most sewers in this country are, we should insist on the main trap and fresh air inlet, though the form of running trap that you show is objectionable. A half S trap with a T branch, as shown in Vol. V., page 81, is much better and less likely to stop up.

The location of the grease trap depends on circumstances. The necessity for its use depends on the amount of cooking done and amount of greasy water allowed to run to waste. Your plan could be improved as follows: use form of main trap above described, assuming your climate will permit it, place trap immediately under the hopper; flush the hopper from a cistern and abandon the valve which affords direct communication between hopper and drinking water supply, and moreover gives an inefficient flush.

Vent the bath tub trap, or, if that cannot easily be done, use a kind of trap not so readily syphoned.]

WATER CISTERNS.

Our readers are probably aware that London is still laboring under the disadvantage of an intermittent water supply, requiring cisterns to hold a supply for all purposes of the household. A correspondent of the London *Daily News*, has been making an inspection of these cisterns, and we quote the following from his account:—

The very first cistern I looked at would, I fancy, if I could have seen inside it, have been a very good specimen for the museum. It was just the length of my umbrella, and somewhere about a foot or fifteen inches square. It had no cover and was fixed up over the water-closet on the one side and the copper on the other, and without being protected from dust by the sloping roof of the wash-house it was so near to it as to render it very awkward indeed to see into it even with a light. I confess I did not attempt to get any more over it. The occupant of that part of the house said she had been there ten years, and she admitted, rather reluctantly, I thought, that she could not remember that that little box had ever been cleaned out. The outside had been painted once, but nothing further had been done to it that she knew of. It was as I have said, over the closet, from the interior of which it was separated only by rough boards forming the ceiling, and thoroughly pervious to effluvium. This was not an isolated arrangement either. I found several precisely the same, only that the record did not run back quite so far. One tenant had been four years in her house, which she shared with a second family occupying the upper floor. These two families both drew their supplies of water from just such a cistern as I have described, and during the four years' residence of the tenant-in-chief it had been cleaned out once. She had evidently never regarded it as a matter she could be expected to attend to herself. It was, she considered, the landlord's business, and though she did not attribute the impurity of the water to the state of the cistern, she complained seriously that if she took a jug of water to her bed-room at night, there was always a sediment at the bottom of it in the morning, and it smelt "filthy" she added. Another woman showed me her cistern of just about the same size—that is, somewhere about a yard long, twelve or fifteen inches deep, and the same in width.

"And when was it last cleaned out?" I inquired. "Cleaned out?" returned the old lady; "why, it was new put in when I came here, and I ain't been here five years." In one or two cases I found a very sensible appreciation of the importance of a clean cistern. "Yes, sir," said one woman, "I give it a good clean out every now and again." "And how do you do it?" I inquired. "Well, I get up on something on the top of the copper and scoop out the water with a saucer, and then well wipe it with a cloth," replied the woman. "And it's all slimy muck inside," she added. Many times during my inquiries I was fairly amused to observe the rigorously economical arrangements of the water company, resulting in the utmost extravagance. "Makes me swear, this tap do," said one woman. "Look there, sir; that's all I can get, and if I want a bucket o' water I has to wait half-an hour for it." That was the case in several houses I visited, and the consequence was that most of them had tubs and buckets standing permanently under the taps, and the water was always allowed to flow in and keep them full, whenever it was on from the street. In several cases I had complaints that the "patent" fittings never acted, and that people were deluged whenever water came in. One poor woman whose walls and floors were saturated told me that she had suffered from an overflow from her cistern ever since this time last year. The inspector came then and ordered the landlord to put the thing right in 21 days. That was last autumn, and the landlord took not the slightest notice of the order, and the water still poured in every time it was turned on from the main, and had done so ever since.

Now I must not pretend to believe that the water arrangements I have been describing are fair specimens of the average London supply. But it is a fact, that without any knowledge whatever of the district I went into, I found what I have described at once and without difficulty. It is reasonable to assume, therefore, that such abuses

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must be very common indeed. It is true that I had had a little conversation with a couple of working plumbers whom I chanced to meet, but they merely indicated to me the district as being within their own knowledge, a bad one. As to bad cisterns, said the men, there would be no difficulty in finding as many as I wanted. They were pretty constantly coming across them. Who was to blame for them? Well, it wasn't easy to say. Sometimes the landlords and sometimes the tenants, and most always the sanitary inspectors. A landlord, perhaps, put up a cistern with a good lid to it and took no more trouble about it. After a bit the lid got rotten, and the tenant would break it up for firewood and then 'twas—perhaps just close to some factory with soot and smoke and fumes all beating down into it. The "young 'uns" would throw things into it, and the sediment would get thick at the bottom, and green slim would begin to grow in it, and it would soon be full of little live things—aye, and dead ones too. "I pulled a dead cat out of the cistern the other day where a whole houseful o' people had been drinking the water," said one of the men, and the rats and mice and dead birds and old boots and rotten rags were among the objects which, in the course of my inquiries, I had mentioned to me as having been found in neglected water cisterns."

Correspondence.

AN EXPLANATION,

ALBANY, N. Y., *Jan.* 13, 1883.

To the Editor of THE SANITARY ENGINEER:

In your issue before last there is a reference to a paper read by me before the Troy, N. Y., Scientific Association, in which you take exception to the following paragraph, while approving the rest: "Finally, we are prepared to say that in a house plumbed in accordance with the requirments of sanitary science, scarlet fever, typhoid, diphtheria, meningitis, etc., will not originate, while they are certainly invited by the absence of such precautions." Your criticism is that correct plumbing, *per se*, is not sufficient to prevent the occurrence of the diseases named, since there are other avenues of attack; as, for example, matters connected with ventilation. Further, the reviewer takes extraordinary pains to impute forced meanings to the word "originate," while avoiding its real, and it seemed to me, obvious meaning. The lecture was wholly devoted to matters of house drainage, everything else being expressly set apart for another occasion; this fact being included in the printed report reviewed. Then, because the germs giving rise to, or necessarily associated with, the diseases named, are discharged into the street sewers from houses where the diseases exist, and because the house drains are merely lateral prolongations of the sewers, it follows that if the plumbing in any house be defective there is chance for these germs, or some of them, to enter that house and cause the corresponding malady. In this sense, then, *as far as the drainage* is concerned, my statement is true and valuable, for there is no other way of accounting for the appearance of the disease, unless one is willing to accept the *de novo* theory referred to by the reviewer. Respectfully,

RICHARD PRESCOTT, Sanitary Engineer.

TRAPS AND DISEASE GERMS.

To the Editor of THE SANITARY ENGINEER:

The important paper of Dr. Carmichael of Glasgow seems to prove that the germs of disease (bacteria or their spores, or, indeed, any *particulate* matter) are unable to pass through a water seal, provided the seal be maintained against evaporation, syphonage, or other destroying influences; and provided the water be kept free from disturbance so that the germs or particulate matter cannot be washed up above the water level and escape when dried on the surface of the trap, and provided, finally, they be not forced through the water in bubbles of air.

I find, however, no record of experiments made in this direction, by other authorities, to corroborate the results of Carmichael, though I have made diligent inquiry among medical men. These appear to have studied the germ theory rather from a surgical and medicinal standpoint, than from that of its relation to sanitary plumbing.

Will you please inform me what books I can consult on the subject of the bacteria in this connection? and especially state what experiments have been made to support the views of Carmichael? Oblige, yours respectfully,

SUBSCRIBER.

[The results obtained by Dr. Carmichael are sustained by the experiments of Dr. A. Wernich, of Berlin, reported in a paper entitled "Die Luft als Trägerin Entwicklungsfähiger Keime," which was published in the *Archiv f. Path. Anat. u Physiol.*, Berlin, 1880, Vol. 79, p. 424, and also reported in a different form in No. 179 of the *Sammlung Klinischer Vorträge*, edited by Volkmann and published at Leipzic in 1880, with the title "Ueber verdorbene Luft in Krankenraümen."

A brief summary of the results obtained by Dr. Wernich is given in the number of this journal for May 1, 1880, page 210.

The results of Carmichael and Wernich were still further confirmed by the results obtained in the very careful and extensive series of investigations made for the National Board of Health, under the direction of Prof. Raphael Pumpelly, of the U. S. Geological Survey, and reported in Supplement No. 13 of the National Board of Health Bulletin, dated April 16, 1881. On page 22 of this Supplement it is stated as the result of the series of experiments detailed that "*At normal summer temperatures no germs were given off from the decomposing liquids whenever their surfaces remain unbroken, even though in some of the experiments the air was continuously conducted over them in a slow current. When the surfaces of the liquids were broken, however, by the bursting of bubbles, germs were invariably given off and the sterilized infusions infected.*" It is a question whether at higher temperatures germs may not be given off from putrefying liquids.

Miguel, in the *Annuaire Meteorologique de Montsouris* for 1878, page 540, says that in the evaporation of putrid liquids at temperatures of 104°–112° F. germs are given off, but this is yet doubtful, and such results are probably due to the drying of a film at the edge of the liquid and the subsequent detachment of fragments of this film by the air current. Such high temperatures are, however, never observed in sewer air.

While it would, perhaps, be theoretically possible to prevent the entrance of germs into a house or room by making it air-tight, filtering all the air entering it, and, in short, treating it like one of Pasteur's culture flasks, it is, of course, practically out of the question to obtain such results in our dwellings. It is very certain that a great majority of the germs of disease must rapidly lose their powers on exposure to light and air; this is shown by the results obtained by isolation of cases of contagious disease, and by the fact that scarlet fever, typhoid fever, small-pox, measles, etc., are very rarely communicated, unless the person catching them has been in the immediate vicinity of persons suffering from the disease or of infected articles.

When we have secured a proper system of drainage for a house we have cut off one possible source of the development or entrance of these germs, and the thing that we aim at for this purpose is to secure a constant current of fresh air through every part of the soil and drain pipes—in other words, to avoid dead ends as far as possible—to prevent the loss of the water seal in our traps by evaporation, syphonage, etc., and to prevent variations in pressure in the air of the sewers from affecting the air in the soil pipes.

It is true that the probability of the causation of serious disease by sewer air in a badly drained house is small, but it is sufficiently possible to warrant our taking precautions against it; and the fact that the great part of the disease and deaths in cities is due to other causes than sewer air, and will, therefore, not be influenced by improvements in house plumbing, is no reason why we should not prevent the small portion which can be thus influenced]

DETECTING IMPURITIES IN THE AIR.

ASBURY PARK, *Dec.* 30, 1882.

To the Editor of THE SANITARY ENGINEER:

Will you have the goodness to inform school teachers, through THE SANITARY ENGINEER, what are the handy methods by which the presence of carbonic oxide and excess of carbonic acid, and other dangerous gases can be detected by non-experts. It seems to me that if teachers were informed how they can learn whether ventilation is sufficient or not, they would (in most cases) be disposed to apply the tests, and regulate the air supply to meet the need. Respectfully, E. R.

[The simplest method of testing the sufficiency of ventilation in a school-room is by the use of lime water. The lime water should be fresh made at intervals of three or four weeks by shaking slacked lime with distilled water, allowing it to settle, and drawing off the clear liquid; or it can be purchased of an apothecary. Procure five bottles with smooth, tight-fitting corks, one containing 20.6 fluid ounces, and the others containing respectively, 10.5, 8, and 6.5 fluid ounces. Obtain also a small bellows or hand-ball syringe, with about a foot of rubber tubing filled to its nozzle. Commence with the bottle which holds 8 fluid ounces and fill it with air in that part of the room which you wish to test by removing the cork and inserting the rubber tube until its end is near the bottom of the bottle, and then working the bellows to pump the air into it. Do this in such a way as to get a fair sample, taking care that neither your own breath nor that of others is pumped in undiluted. Having secured the sample, pour into the bottle half an ounce of lime water, cork, and shake thoroughly and allow it to stand for five minutes. If you then find that the lime water has become perceptibly turbid, as if a little milk had been dropped in it, you may be sure that the proportion of carbonic acid present is 8 or more parts in 10,000, and that the ventilation is insufficient. In this case repeat the experiment with the bottle containing 6.5 ounces; if the same quantity of lime water in this bottle is also rendered turbid, the proportion of carbonic acid is 10 or more parts in 10,000, and the ventilation is decidedly bad. If, on the other hand, the lime water is not rendered turbid in the 8 ounce bottle, test by the same quantity in the bottle holding 10.5 ounces. If this is not made turbid, the quantity of carbonic acid present is less than 6 parts per 10,000, and the ventilation is certainly sufficient. The largest bottle, containing 20.6 fluid ounces, is to test the proportion of carbonic acid in the external air. Usually when half an ounce of lime water is shaken in a bottle of this size containing air collected in the street, it will show a slight turbidity, indicating the presence of carbonic acid in the proportion of about 3 parts in 10,000.

Simple as this testing is, it requires care and attention to details. The bottles must be thoroughly cleansed and dried after each experiment, and the lime water must be fresh. Two hours' practical instruction by a chemist in the details of manipulation would be worth more to you than a volume of description. The following is a part of a table given by Dr. Smart, to show the amount of carbonic acid indicated by bottles of various sizes used as above described.]

Size of bottle in fluid ounces	*Carbonic acid in volumes per 10,000 of air.*
20.6	3
15.6	4
12.5	5
10.5	6
9.1	7
8.	8
7.2	9
6.5	10
6.0	11
5.5	12
4.5	15

VENTS CAST WITH TRAPS.

NEW YORK, *Jan.* 16, 1883.

To the Editor of THE SANITARY ENGINEER:

Why do not the dealers in or makers of lead 1¼", 1½", and 2", cast traps now cast upon the crown of each, a 2" branch to which the branch vent-pipes for ordinary houses could be attached by a wiped joint?

In that way a much better and cheaper job could be made by the plumber than the present method of drilling a hole in the crown, and making an irregular wiped joint. Could you not suggest it. Yours, etc.,

WALTER G. ELLIOT, PH.D.

[There probably has been no demand for them. This suggestion was made by Mr. Samuel Crump, in these columns, page 522, Vol. V. We presume that plumbers do not consider that much labor would be saved. Moreover, it is impracticable to attach the air vents at exactly the same point every time. This is a matter in which we should like the opinions of practical plumbers.]

SHONE SYSTEM OF SEWERAGE.

SACRAMENTO, *Dec.* 26, 1882.

To the Editor of THE SANITARY ENGINEER:

Some time ago I received a pamphlet containing an exposition of the Shone system of sewerage from you, and I wish to make the following inquiries, which you may answer through the columns of your paper, or privately, if you wish, viz.:

1st. Has the Shone system been applied to the drainage of any town as yet, and, if so, with what success?

2d. Do you consider that the use of compressed air, as described by Isaac Shone, would work satisfactorily and economically?

3d. Do you think that the automatic and other mechanical arrangements of his ejectors would work satisfactorily?

Our city is much in need of improvements in its sewerage system, and I am engaged in collecting the necessary data for determining what plan it is best to fix upon.

Our city is located upon a level plain, with poor drainage outlets; I am satisfied that if the working of the Shone system is satisfactory, it is the best system for our location.

Any information you can give, or any sources of information you can refer me to, will be thankfully received.

Very respectfully, L. F. BASSETT.

[The Shone system was reviewed at length on pages 60 and 61, Vol. IV., Jan. 1, 1881. We have never sent a

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pamphlet of the Shone or any other system to our correspondent, though it is possible he may have purchased some book from the Book Department of this journal.

The Shone system has been applied at Eastbourne, a watering place on the south coast of England, and, we understand, satisfactorily.

The economy of using compressed air for the purpose proposed depends on local circumstances. When these circumstances are fully comprehended by a competent engineer, he can determine whether it would be better and more economical to rely on pumps, or apply compressed air to move sewage. No general answer can be given. Our correspondent will find the use of air as a motive power discussed by Prof. Henry Robinson at page 157, issue of THE SANITARY ENGINEER of March 1, 1881.

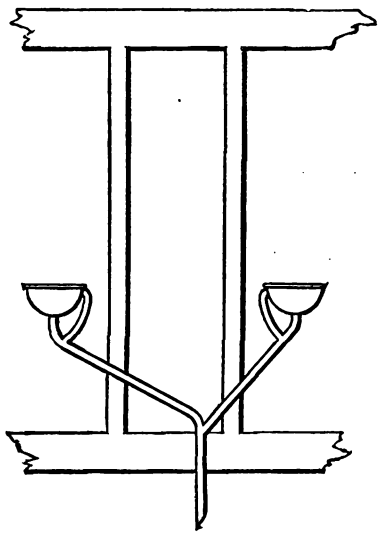
Messrs. Spon have published two books for the Shone Company—one a pamphlet at 60 cents, the other a plan proposed for the city of Portsmouth, England, at $4.20. Either can be obtained of the Book Department of THE SANITARY ENGINEER.]

NOISE IN BASIN WASTE.

WOBURN, MASS., *Jan.* 8, 1882.

To the Editor of THE SANITARY ENGINEER:

I write to you about a trouble with a waste pipe I was called to look at. I will draw it out on the other side of this sheet.



There are two basins with outlets very near together, and no traps under either one, but a trap in the cellar; when they draw a bowl of water it makes a noise like thunder. I wanted to take out the lead pipe and put in 2-inch soil pipe and run it through the roof, but the man thought it would not do, so I put a round trap in and ran the wastes from each basin into it (the trap is at the point where the branches from each basin join the vertical pipe). It makes as much noise as ever. I would like your opinion.

The people here have a plan of putting the traps in the cellar, so they will not freeze, and others will have no trap at all. How can I teach them common sense?

Yours truly, T. H.

[Your waste pipe is probably small, and the noise is caused by the sucking in of air at one bowl while a pipe full of water is being discharged from the other.

No such arrangement as you show should be in any house. The waste pipe should extend through the roof, each basin should have a trap close under it, and not at the bottom of the line. If you read THE SANITARY ENGINEER you can see in almost every issue the proper way to connect basins to a waste pipe and to trap them.]

Mr. L. O. Howell by way of explanation of the use of the name of THE SANITARY ENGINEER in his advertisement writes us: "In regard to your endorsement on all my cards and letter headings, I distinctly say Sanitary Engineers. The paper you have with the words 'Engineer' is a small paper published in the north western part of the city, and in copying has made a mistake which I cannot help."

WINTER BATH HOUSES FOR THE POOR.

We fully agree with the *Commercial Advertiser* in its demands for bath houses for the poor, but there are much weightier reasons for public baths, than for soup houses. The necessity for the latter we very much doubt.

The *Advertiser* says:

"If there is one thing more than another from which poor people suffer at this season it is the need of a bath, or facilities for washing. The diseases which destroy life in tenement houses would not crop out and spread could occupants have an opportunity of bathing. All summer long, when free salt water baths are open, those who live in crowded apartments bathe and keep well. Now, a trip through the abodes of the poor will satisfy any one of the miserable condition of some member of nearly every family. Rheumatism, fever, "malaria," or any of the maladies consequent upon impoverished blood, resulting from a skin stifled by impurities, are sadly prevalent. Bath houses for the poor in winter are as necessary as soup houses. The Board of Charities would save expense by providing these, when pest houses and hospitals would have fewer occupants. Give the poor a chance to keep clean, and we will have fewer vagrants, tramps, and criminals."

CHICAGO MASTER PLUMBERS.

(From our Special Correspondent.)

CHICAGO, *Jan.* 18, 1883.

The modest Fairbank hall in Central Music Hall building was quite filled this evening on invitation of the Master Plumbers' Association, the occasion being the first of a series of lectures under their auspices on practical sanitary subjects. Mr. Andrew Young, Corresponding Secretary, introduced the speaker, saying:

"Ladies and gentlemen, on behalf of the Plumbers' Association I bid you welcome to this our first lecture on sanitation. The attendance here to-night shows that the interest in this subject is felt pretty thoroughly. It is the intention of our association to have public lectures from time to time on sanitary subjects, a course that will benefit ourselves and strengthen the hands of our Health Department. I now have the pleasure of introducing to you Prof. A. Reeves Jackson."

The lecturer, in beginning, expressed his gratification at seeing present so many plumbers and so many plumbers' helpers. "I think it is the first time that I have ever seen the plumber and his helper when I had a degree of pleasure indeed. Until quite recently I have had the impression that a plumber was the natural enemy of mankind, and that his work was entirely at fault and in opposition to that of the doctor; that while the aim of the doctor was to dose, that of the plumber was to bewilder and destroy. I have thought that there was but a single thing in common between the two; namely, that both when they had made a mistake, had done a bad piece of work, were anxious to have it hid from the eyes of the world as quickly as possible, the plumber to do this having at his command lath and plaster and the doctor six feet of earth. As for the helper, I have regarded him simply as a fiend, worse only, if possible, than the plumber himself. But I am a changed, a converted man. I have learned to know the plumber as he is, and to know the helper as *she* is, and henceforth I am on the side of the plumber, and the more ladies he has the more I am on his side.

"But I didn't come here to-night to lecture on Sanitation. I come before you simply to apologize, and I am not quite sure but that, as I am not going to lecture, it is right and proper that you should know why. One week ago a committee of one of your number came to me and said, 'we are an abused class; the public don't understand us and our high aims; the public think that the only high things about us are our charges; they think that we are not human, that we are only plumbers, that we are men and being plumbers we have an association. Don't attempt to instruct us. The members of that association have too much knowledge already and they don't want any more. They are discouraged at their position and they want encouragement, they are sad and want something entertaining.' I should have been proud to talk about the Board of Health, the principles of sanitary science, small-pox, house drainage, bacteria and all that, but you would not have it so, immensely valuable as the information would have been."

Following Dr. Jackson, Professor J. J. M. Angier, of the College of Physicians and Surgeons, gave a talk on sanitation, replete with good points.

COMPLAINT AGAINST UNDERGROUND STEAM PIPE.

The occupants of a number of buildings on William St. between Cedar and Pine recently complained to the Board of Health of offensive odors believed to be due to the underground pipes of the American Steam Heating and Power Co. An inspection was made by the Board and the report presented at the meeting last week. The odor in some places seemed to the inspector to be clearly caused by gas escaping from a leaky main. In other places a tarry odor prevailed which he believed came from creosoted planks surrounding the steam pipes and probably due to a slight leak.

The Board took no action on the matter. A more complete investigation is to be made, we understand, before any decisive action is taken.

A smoke consumer invented by the Superintendent of the Excelsior Manufacturing Co., of St. Louis, is described by the *Age of Steel*. A draft of air is admitted through the ash pit and upwards through a hollow bridge wall, and passes through a perforated cast iron top piece. A 2-inch gas pipe, running crosswise the boiler, is set in the lining just above the fire door. The pipe has a row of ⅛-inch holes drilled about an inch apart, so set that the draft of air passing from the holes will strike about half-way between the grate bars and the top of the bridge wall. On the outside of the side wall is fastened on, to the end of the 2-inch gas pipe, a funnel-shaped piece of tin. From the steam drum there extends a ½-inch steam pipe, with a stop valve, to the funnel-shaped piece of tin and into the two-inch pipe two or three inches. When the steam is turned on it creates a strong draft of air through the funnel-shaped piece of tin into the 2-inch pipe, from which it passes into the fire bed through the perforated pipe.

The western end of the island of Montreal has been suffering greatly from the failure of springs which have furnished plenty of water heretofore.

The mine water in the Pennsylvania coal regions is so strongly impregnated with sulphur and filled with coal dust as to render the water of the Schuylkill into which it flows, unfit for domestic use or for steam boilers. The Philadelphia *Press* states that at Gilberton, near Pottsville, the water needed for boilers is purified by the following process. It is first pumped into large tanks and a certain quantity of lime is sprinkled on the surface. In an hour and a half it has become perfectly clear. Before using, it is tested with lithmus paper, for the presence of too much sulphur or a surplus of lime, and if not suitable is further treated. When in a satisfactory condition, it is drawn off for use and the tanks cleaned of their deposit and re-filled again. The expense of this operation is much less than that of procuring water from a distance.

Philadelphia water was bad the other day. The chief of the Water Department attributed it to the freezing over of the Schuylkill and the consequent impossibility of proper aëration. The Water Committee requested the Fairmount Park Commissioners to cut and remove the ice on the river.

The Illinois Tilemaker's Association had an interesting convention at Springfield, on Jan. 16-17, and discussed practical questions relating to the manufacture and use of drain tiles. We have frequently spoken with commendation of the meeting of persons engaged in the same business, at stated times, for an interchange of ideas. Much good must result from it. There are always some persons present, of course, who only desire to ride their own hobbies, but it is generally found that the common sense of the great majority of the members is proof against their attacks.

The Schuylkill river continues offensive to taste and smell, and no one in Philadelphia has been able to account for it satisfactorily or to suggest a remedy. Coal tar has its uses and advantages, but the human palate has not yet been educated up to the point of recognizing it as a pleasing beverage. The commission of experts, appointed by the Mayor to investigate the present and future water supply, have collected samples of the water, but there is no appropriation to make analyses. But there have been any number of amateur analyses made with the usual result of discovering what every one knew, that the water is bad, but no one knows exactly why it should be so much worse now than at any other time.

A magistrate at Paterson, N. J., administered an oath by telephone the other day.

Small-pox has broken out in a lumbering camp in Northwestern Canada.

Between May 1, and November 30, 1882, 1,644½ miles of streets was swept in Chicago; an average of 235 miles per month.

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

The annual meeting of the above organization was held at the Society's rooms, 127 East 23d st., on Wednesday of last week. About fifty members, or less than one-tenth the whole number, were present. The following are the newly elected officers of the society: Charles Paine, President; W. H. Paine and Henry Flad, Vice-presidents; John Bogart, Secretary and Librarian; J. J. R. Croes, Treasurer; and G. S. Green, Jr., J. P. Davis, William Metcalf, W. E. Merrill and W. G. Hamilton, Directors. The "Norman" medal for the last year was awarded to A. Fteley and F. P. Stearns, of Boston, for a joint paper on "The Flow of the Water of Sudbury River." An amendment to the constitution providing for the formation of branch sections was unanimously recommended for adoption by letter ballot. The proposed amendment permits the Board of Directors to consider, and a two-third vote of the society to grant, an application of ten or more members to form a local section in any place for the convenience of those living too far away to attend the New York meetings. Those not members of the society may (if the amendment be adopted) attend the meetings of the branch sections and take part in the discussions, which may be published in the proceedings of the society. The special committee on uniform standard time approved the action of Congress in authorizing the President to call an International Congress to consider the subject, and recommended the calling of a convention as soon as possible to determine upon a standard best adapted to the interests of North America.

The greater part of the next day, Thursday, was devoted to an excursion to various objects of engineering interest in the city and vicinity. In the morning a navy yard tug, placed at their disposal by Com. Upshar, took the party to the Erie Basin, where an hour was spent in the inspection of the great dry docks, under the guidance of Messrs. J. E. Simpson and Sons, the builders, and M. M. Tidd and F. C. Prindle, members of the society and engineers of the pumping machinery. Returning by the tug to the Brooklyn wharf of the East River Bridge, that structure was inspected, a portion of the party crossing the river span after examining the Brooklyn approach, and the remainder crossing in the tug. The footway which was to have been completed on the 15th, was delayed by the non-arrival of a ship load of plank, and those who crossed, did so on the narrow path of loose plank used by the workmen. The party was accompanied by the engineers connected with the construction of the bridge, Messrs. Collingwood, Martin and Paine, who explained the chief feature of interest in the more recently erected parts. Mr. Paine exhibited a micrometer used in determining stresses in truss-ties at those places where the stresses are irregular and difficult or impossible to determine by analysis. It consists of a bar of steel ten feet long and about one and one-half inches wide and one-eighth inch thick, with a micrometer attachment at one end reading to one-millionth of the length of the bar. Screws ten feet apart are inserted in every diagonal where the stresses are irregular and the measuring bar inserted between their projecting ends. The stresses produced in the bar under various portions of the load, are calculated from its change in length. The screws are left in the bars and protected from corrosion and other injury by putty and paint.

After lunch at Delmonico's, the party proceded to the Mills' building, where they were met by the architect, Mr. Geo. B. Post, who first explained to them the peculiar difficulties under which the building was erected, and then exhibited the very interesting method he had adopted of supplementary foundations and other peculiar features of the structure.

Station B, of the New York Steam Heating Company, was the next and last place visited. A model had been prepared showing the method of laying the pipes under ground and by reference to it together with maps and plans and the works in sight, Mr. C. E. Ennery, the engineer-in-chief, explained very fully the gigantic scheme, of which our readers will find a description in this number of THE SANITARY ENGINEER.

In the evening a reception was held in the house of the society, at which over 100 members and invited guests were present.

THE ENGINEERS' CLUB OF PHILADELPHIA.

The fifth annual meeting of the Engineers' Club, of Philadelphia, was held the 13th inst. The annual address by the retiring president, Mr. Rudolph Hering, was a review of the progress of engineering. He closed with recording the advance in the different branches of city engineering, which includes water and gas supply, the furnishing of steam for heat and power, of electricity for light and power, the removal of waste matters, and the paving of streets.

Mr. G. S. Strong presented a description with illustrations of his new design for express locomotives.

The officers for 1883 are as follows: President, Henry G. Morris; Vice-President, William A. Ingham; Secretary and Treasurer, Howard Murphy; Directors, T. M. Cleemann, Frederic Graff, Rudolph Hering, Strickland Kneass, and Percival Roberts, Jr.

BROOKLYN WATER PURVEYOR'S REPORT.

By the courtesy of Mr. Milne, Water Purveyor of Brooklyn, we are enabled to present to our readers this week his Annual Report to the Commissioner of the Department of City Works. His statements and views on the subject of Water Waste are especially timely and valuable. The report given below is complete, with the exception of the tables and statements of the work done by the Department during the year.

BROOKLYN, *Jan.* 8, 1883.

HON. RIPLEY ROPES, *Commissioner Dep't City Works:*

SIR:—I herewith submit the Annual Report of the Purveyor's Bureau for the year 1882.

The records of the Chief Engineer's Bureau show a daily average increased consumption of water for the year 1882 over the year 1881 of 1,891,091 gallons, as herewith shown:

Average daily consumption year	1882,	34,622,590	gallons.
" " "	1881,	32,731,499	"
Average daily increase "	1882,	1,891,091	"

The records of the Meter Department indicate a consumption of water as registered by meters of 1,460,044,001 gallons for the year 1882, and shows an increase over year 1881 of 164,086,863 gallons, as herewith shown:

For year 1882	1,460,044,001	gallons.
" 1881	1,295,957,138	"
Increase for year 1882	164,086,863	"

The daily average consumption per capita for year 1881 was	58.44
The daily average consumption per capita for year 1882 is	58.22
Showing a difference in favor of 1882	.22

The average daily consumption of metered water per capita is 6.72 gallons, leaving 51.20 gallons for all other purposes, including domestic use, fire purposes, flushing sewers, street washers, street sprinklers, public fountains, drinking hydrants, bar rooms, horse troughs, water for shipping, tug boats, private stables, leaks in water mains, and all other uses not determined by meter measurement. Making a liberal allowance for each item above mentioned, the factor 15 appears, which I am compelled to charge to account of *waste*, as follows:

Average daily consumption per capita		58.22 galls.
Average daily consumption per capita determ'd by meter.	6.72 galls.	
Purposes enumerated above	36.50 "	
Waste	15	58.22 galls.

The estimated daily waste per capita is 25.76 per cent. of the daily consumption, and it is the minimum figure compared to data usually applied to the item of waste in City Water Works.

I have in previous reports expressed my views concerning this important question and can only supplement them by stating that my experience during the past year adds emphasis to the already expressed opinion, that radical measures must be enforced to effectually check waste of water, *nearly* 9,000,000 *gallons being wasted daily.*

It is a subject with which the people should be made thoroughly familiar, in order to prepare them for the consideration of questions which will inevitably force themselves upon our notice. I am aware that it is not an easy task to attempt to educate public sentiment to a point where it will look favorably upon a restricted supply of water, especially after an experience of 23 years of lavish and wasteful use of it. Measures should, however, be adopted compelling the use of water-saving devices on all premises.

Another feature of waste of water is manifest in the manner in which plumbing work is constructed without regard to the question of pipes being affected by *frost*; owners of all premises should be compelled to so construct plumbing work as to be absolutely frost-proof.

The adoption of stringent rules and regulations for the carrying out of these suggestions will go far toward reducing waste of water. Should house owners then pay no attention to the efforts of the Department in suppressing waste, and still be indifferent to the vital interests of a city of 600,000 people, all dependent upon its water supply, they should then be promptly and rigidly dealt with, and water cut off from premises or a meter applied to the service-pipe, thereby compelling the payment for all water consumed in excess of the amount to which they may be entitled, in consideration of the payment of Water Rates.

The work of the Inspectors of Plumbing develops a large amount of defective plumbing work, the owners of which are not likely to cause repairs to be made, unless the waste of water causes them personal inconvenience. Many devices used by plumbers for the distribution of water in dwellings are wasteful in character, and others have become so by reason of faulty construction, hence it is necessary for inspectors to repeat their visits frequently.

METERS.

During the past year 292 meters have been set upon service-pipes supplying water for manufacturing purposes, restaurants, bar-rooms, stables, railroad watering stations, large apartment dwellings, and large private residences, and also upon a number of buildings used for office purposes. The general condition of meters now in service is better than formerly, the meter accounts are very satisfactory, testifying to increased care on the part of those having charge of them.

There are many details in connection with the work of setting and maintenance of meters. By referring to the accompanying tables, a better idea of its character may be obtained.

FIRE HYDRANTS.

The new plan for the inspection and repair of fire hydrants has been attended with success. It is a decided improvement in the saving of time and money. Heretofore men were employed as Inspectors who simply reported their condition; if the hydrants were found leaking at their waste during freezing weather, it was their duty to pump them out, but any repairs required were reported at the Repair Yard. Now a horse and wagon is employed and a machinist and helper, equipped with requisite tools and fixtures, make the daily rounds inspecting and repairing, reporting daily the condition of hydrants. This change is for the better, and is a step in the way of increased efficiency and in addition thereto, will effect a saving of $6,554 over the old plan, per annum.

RE-SURVEY OF PIPE DISTRICT.

This branch of the service during the year 1882 has been an advantage to the City, resulting in an increase of permanent revenue amounting to $7,297.18 to May 1st, 1882. Since which date 103 streets and avenues have been surveyed; during the year 104 buildings were deprived of water in consequence of non-payment of extra water rates, together with expenses and fines attending the cutting off of water.

DRINKING HYDRANTS.

The drinking hydrants of the entire city have been inspected regarding their use, and reports of the Inspector employed for that purpose have furnished information which has satisfied us in shutting off supply water to many of them, and as soon as the weather permits, such of those which are not required for legitimate use will be removed.

Respectfully submitted,

PETER MILNE, JR.,
Water Purveyor.

Complaint is made of the condition of the sewerage system in the vicinity of the gulf in East Utica, which it is said doubled the usual amount of sickness.

A disease somewhat resembling cholera morbus has attacked a large number of the residents of North Rose and vicinity. It is doubtless caused by the use of the first water that comes into wells that have been dry a long time. All of the cases readily responded to prompt treatment and terminated favorably.—*Rochester Democrat.*

There is a great scarcity of water in the Eastern States, and many mills run by water-power have been obliged to shut down for want of supply, thus throwing large numbers of operatives out of employment.

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POWER OF A STATE BOARD OF HEALTH TO LEVY A QUARANTINE TAX.

The following is the text of Judge F. A. Monroe's decision reprinted from the New Orleans *Times-Democrat* in the case of Morgan's Louisiana and Texas Railroad and Steamship company, against the Board of Health of the State of Louisiana, denying the right of the latter to levy a quarantine tax.

Plaintiff owns a number of steamships which are engaged in the business of commerce between the port of New Orleans and various other ports in the United States and elsewhere.

Under the quarantine laws of this State, each of these ships entering the port of New Orleans through the mouth of the Mississippi river is required to report at the quarantine station, established by the State authorities at the latter point, for the purposes of inspection and, if necessary, of disinfection.

When the ship hails from a port in which yellow fever does not usually prevail, and in which no contagious or infectious disease is reputed to exist, and has not touched at any such port, and has not come in contact with any vessel having any contagious or infectious disease on board, and there is no contagious or infectious disease actually on board of such ship, and she is not in a foul condition, the master, upon payment of the sum of thirty dollars, is furnished by the health officer at the station in question with a "permit" to proceed with his ship to the city of New Orleans.

When, however, the ship comes from a port in which yellow fever usually prevails, or in which some contagious or infectious disease is reported to exist, or has touched at such port, or has come in contact with some vessel having such disease on board, or actually has such disease on board, or is in a foul condition, she is detained at the station and subjected to a process of disinfection by fumigation and other methods, after which and upon payment of the $30 mentioned above as the charge for inspection, and of an additional sum of from $20 to $25 as the charge for disinfection, the "permit" or certificate is given and the ship is allowed to enter the port.

The particular statute under which the fee or charge of $30 is exacted is the Act No. 69, of 1882, which reads as follows:

"SECTION 1. *Be it enacted, etc.*, That the resident physician at the Quarantine Station on the Mississippi river shall require for every inspection and granting certificate, the following fees and charges: For every ship thirty ($30) dollars; for every bark twenty ($20) dollars; for every brig, ten ($10) dollars; for every schooner, seven dollars and fifty cents, ($7 50), for every steamboat (towboats excepted) five ($5) dollars; for every steamship, thirty ($30) dollars.

"SECTION 2. That the Board of Health shall have an especial lien and privilege on the vessels so inspected for the amount of said fees and charges, and may collect the same, if unpaid, by suit before any court or competent jurisdiction, and in aid thereof shall be entitled to the writ of provisional seizure on said vessels."

By virtue of other provisions of law, which it is unnecessary to quote, the Board of Health requires the payment of $20 or $25 additional as the cost of disinfection when such treatment is considered necessary.

The effect of the present suit is to perpetually enjoin the collection of these charges, and to restrain the Board of Health from detaining the plaintiff's vessels because of their nonpayment, or from enforcing the quarantine regulations as against said vessels in a more oppressive manner than against others.

The plaintiff alleges that the laws relied on, in so far as they purport to authorize the exaction of the fees and charges in question, are null and void, in that they contravene—

1. Article 1, section 8, paragraph 3, of the Constitution of the United States, which provides that:

Congress shall have power * * * * to regulate commerce with foreign nations, and among the several States and with the Indian tribes.

2. Article 1, section 10, paragraph 3, which provides that: "No State shall, without the consent of Congress, lay any duty of tonnage."

3. Article 1, section 9, paragraph 6, which provides that "No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another, nor shall vessels bound to or from one State be obliged to enter, clear or pay duties in another."

It is remarkable that in view of the fact that the convention which adopted the Constitution of the United States distinctly determined, after the most elaborate and earnest discussion, that the States should not be allowed, without the consent of Congress, to levy duties of tonnage for any purpose whatever; that it should still be considered a subject for discussion as to whether such duties may not be imposed for the support of a police or quarantine regulation established by a State for the protection of the health of its citizens.

In order to show how clearly this whole subject was placed before the convention, I quote the following passage from the "History of the Constitution of the United States," by Judge Curtis, vol. 2, p. 370. He says:

"In order to vest the supervision and control of the whole subject in Congress, it has further provided that no State, without the consent of Congress, shall levy any duty of tonnage. An exception proposed by some of the Maryland and Virginia members (of the convention which adopted the constitution), with a view to the situation of the Chesapeake bay, illustrates the object of this provision. They desired that the States might not be restrained from laying duties of tonnage 'for the purpose of clearing harbors and erecting light-houses.' It was, perhaps, capable of being constructed that, as the regulation of commerce was already agreed to be vested in the general government, the States were restrained by that provision from laying tonnage duties. The object of the special restriction was to make this point entirely certain; and the object of the proposed exception was to divide the commercial power, and 'to give the States concurrent authority to regulate commerce for a particular purpose. But a majority of the States considered the regulation of tonnage an essential point of the regulation of trade. They adopted the suggestion of Mr. Madison, that the regulation of commerce was in its nature indivisible and ought to be wholly under one authority. The exception was accordingly repealed.'"

It was certainly capable of being constucted with great force of reason, with reference to the particular exception proposed in the convention—that the clearing of harbors and the erection of light-houses might be regarded as a service rendered to commerce, and that in paying therefor the commerce of the country would merely pay for service rendered.

The conclusion of the convention, however, appears to have been that the power to impose compulsory charges or exactions for any purpose, or upon any pretext, involved the power to regulate commerce, and that the power ought to be vested in the general government and be undivided.

They, therefore, refused, as we have seen, to adopt into the Constitution an exception permitting the States to lay a duty of tonnage to clear harbors and erect light houses.

They did, however, adopt a provision which has the appearance of an exception to the clause vesting in Congress the power to regulate commerce; I refer to paragraph 2, section 10, article 1, which provides that—

"No State shall, without the consent of Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws, and the net produce of all duties and imposts laid by any State on any imports or exports, shall be for the use of the Treasury of the United States, and all such laws shall be subject to the revision and control of the Congress."

It is conceded that the inspection laws thus referred to are such laws as may be enacted for the inspection of merchandise, and that the imposts or duties in question are such as may be imposed upon merchandise.

This exception, therefore, in no way, affects the prohibition contained in the very next paragraph of the same article, to the effect that "no State shall, without the consent of Congress lay any duty of tonnage," since the duty of tonnage is levied upon the ship, and is not an impost or duty upon merchandise imported or exported. The exception is attached to the prohibition to which it relates whilst the prohibition against the levying of duties of tonnage stands alone and without the exception, nor can this exception be held to affect the power of Congress to regulate commerce.

In Gibson *vs.* Ogden, 9 Wheat, 205, the Supreme Court said:

"The object of the inspection laws is to improve the quality of articles produced by the labor of the country, to fit them for exportation, or it may be for domestic use. They act upon the subject before it becomes an article of foreign commerce, or of commerce among the States, and prepare it for that purpose."

So in the case of Brown *vs.* Maryland, 12 Wheaton, 420, it was said:

"The tax or duty of inspection is frequently, if not always, paid while the article is in the bosom of the country."

* * The exception was made because the tax would otherwise have been the prohibition.

Considering the language last above quoted, it occurs to the mind at once that even if this exception should have the effect of leaving with the States the power to regulate commerce for the purposes of the inspection of merchandise, this results solely from the fact that said exception is embodied in the Constitution, but when we further consider the limitations to which the exception is subject, it becomes more and more manifest that it can have no such effect; since, in the first place, it is provided that the net revenue of all such imposts shall be for the use of the United States Treasury, thus confining the interests of the State in the matter to the actual cost of inspection, and guarding against the use of the power referred to as a means of regulating commerce; and, in the next place, it is provided that "all such laws shall be subject to the revision and control of the Congress," or that if perchance, inspection laws were used for the purpose of regulating commerce, Congress could at any time remedy the evil by proper legislation.

It may safely and properly be said, therefore, that there is not to be found upon the face of the Constitution a single exception to the rules; that Congress alone has the power to regulate commerce, and that the States, without the consent of Congress, have no power to levy duties of tonnage.

After the adoption of the Constitution, it being conceded that the States had not divested themselves of the power to establish and enforce their own health and police regulations, and there appearing a possibility that these regulations might interfere with, or be interfered with by the laws passed by Congress for the regulation of commerce, certain acts were passed by Congress, concerning which Chief Justice Marshall used the following language, to wit:

"The acts of Congress passed in 1796 and 1799, empowering and directing the officers of the general government to conform to and assist in the execution of the quarantine and health laws of a State, proceed, it is said, upon the idea that these laws are constitutional.

"It is undoubtedly true that they do proceed upon that idea, and the constitutionality of such laws has never, so far as we are informed, been denied.

"But they do not imply an acknowledgment that a State may rightfully regulate commerce with foreign nations or among the States; for they do not imply that such laws are an exercise of that power or enacted with a view to it.

"On the contrary, they are treated as quarantine and health laws, are so denominated in the acts of Congress, and are considered as flowing from the acknowledged power of a State to provide for the health of its citizens. That as it has appeared that some of the provisions made for that purpose and in virtue of this power might interfere with and be affected by the laws of the United States made for the regulation of commerce, Congress, in that spirit of harmony and conciliation which ought always to characterize governments standing in the relation which that of the Union and those of the States have to each other, has directed its officers to aid in the execution of these laws, and has, in some measure, adapted its own legislation to this object by making provisions in aid of those of the States. But in making those provisions the opinion is unequivocally manifested that Congress may control the State laws so far as it may be necessary to control them for the regulation of commerce." 9 Wheat., 205.

Referring to the act of 1799, mentioned in the foregoing opinion, we find that it contains the following section and proviso, to wit:

"The quarantine and other restraints which shall be required by the health laws of any State, or pursuant thereto, respecting any vessels arriving in or bound to any port or district thereof, whether from a foreign port or place, or from another district of the United States, shall be duly observed by the Collectors" (and other Federal officers).

* * * * * *

"*Provided*, That nothing herein contained shall enable any State to collect a duty of tonnage or impost without the consent of the Congress of the United States."

The insertion of the proviso was unnecessary perhaps, as the Constitution itself contains the same prohibition; but it may have been thought that the language of the act would be construed as implying the consent of Congress to the levying of tonnage to support quarantine, and the insertion of the proviso is significant as showing that Congress (at that time composed of men some of whom had framed the Constitution) entertained no doubt that whilst the State might, without the consent of Congress, enact and enforce their health laws, they could not levy duties of tonnage to defray the expense of the same.

It was also found upon the adoption of the Constitution that there was in force in every State a system for the regulation of pilotage, which system was adopted by Congress by act of August 7, 1789, and given the same validity as if its provisions had been specially enacted by Congress. If, therefore, any duty of tonnage for pilotage or half pilotage is collected, such collection is made with the consent of Congress.

Again, in many ports, wharves have been constructed either by private or municipal enterprise, and all vessels landing at such wharves are charged a certain amount—either so much per ton, or a fixed sum for vessels of a particular description—for the use of the wharves and the peculiar artificial facilities afforded by them upon precisely the same principle that charges are made by the proprietors of dry-docks for accommodations to vessels, except that the charge for wharfage upon the banks of navigable streams cannot exceed a reasonable compensation.

So, in the case of port wardens, if the master of a vessel permits them to render a service to his vessel, the port warden is entitled to his compensation. But I think it the correct principle, as stated by the learned counsel for plaintiff in his brief, that any charge imposed by the State upon a vessel engaged in commerce, for which no equivalent is given, is a duty of tonnage, whether such charge be measured by the tonnage of the vessel or imposed as a fixed sum upon all vessels of a particular character. And beyond this, I am satisfied that the States have no authority to impose upon vessels services which are neither needed, nor desired, and exact payment therefor of sums fixed by the States themselves.

In the case at bar, for instance, it appears from the testimony that the fumigation of a vessel for the purposes of disinfection destroys more or less of the roaches and other vermin by which ships are sometimes infected, and it may be said that the destruction of such vermin is advantageous to the ship, but it would be difficult to demonstrate upon what principle of law or common sense the State of Louisiana should be permitted, against the wishes of the owner, but at his expense, even to destroy vermin on his vessel, unless in furtherance of some police or health regulation; but the very basis of the power which the States possess, to adopt and enforce such regulation is the inherent and inalienable right of self-protection. And the basis of the argument of the defence in this case is that the State has exercised this power to establish quarantine for the protection of her citizens; neither the power, therefore, nor the manner of its exercise in this case, affords the shadow of a pretext for the claim that vessels quarantined against the wishes of the owner, are thereby rendered a service for which a sum of money arbitrarily fixed by the State, may be exacted.

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The point upon which counsel for defendant appears to place most reliance is, that the charges which are here objected to are not duties of tonnage, because they are not proportioned to the tonnage of the vessel taxed, but are fixed with reference to the class or character of the vessels.

If as we have seen, no service is rendered to the vessel, there exists no basis for the charge, whether it be a duty of tonnage or not; but the proposition that a steamship of 3,000 tons can be forced to pay $30 toward the support of our health and quarantine system, provided the charge is imposed without the use of the word tonnage, and yet that nothing could be collected for so excellent a purpose if the charge is imposed at the rate of one per cent. per ton, it seems to me is disrespectful to the Constitution of the United States.

The same point, has however, been suggested before, and was thus disposed of by Chief Justice Chase: "It was not only a pro rata tax which was prohibited, but any duty on the ship, whether a fixed sum on its whole tonnage or a sum to be ascertained by comparing the amount of tonnage with the rate of duty." 6 Wallace, 33.

In this same case, in referring to the question of the right of the port warden to collect fees without the rendition of specific services, upon the theory that it was an advantage to commerce that such officers should be at hand, the court said:

"It may be true that the existence of such a body of men is beneficial to commerce, but the same is true of the government of the State, of the city government, of the courts, of the whole body of public functionaries. If the constitutionality of the charge for the benefit of the master and wardens, can be maintained upon the ground that it secures compensation for services it is difficult to perceive upon what ground the constitutionality of any State law imposing taxes for the benefit of the State government, upon vessels landing at its ports can be questioned." 6 Wall., 33. See also 12 Wall., 218; 20 Wall., 580; 31 Ann., p. 65; 34 Ann., 703.

An intervention was filed in this suit by the Attorney General, on behalf of the State, in which it is alleged that the plaintiff is seeking to have annulled laws "whereby revenues are raised and provided for the maintenance and support of the quarantine system and service of said State for the prevention of the introduction of contagious and infectious diseases into the State of Louisiana," etc., all of which is undoubtedly true, and exhibits sufficient interest on the part of the State to justify the intervention.

It also serves to illustrate more clearly the conflict between the laws referred to and the Constitution of the United States, since it is thus judiciously admitted and averred by the State of Louisiana that she derives a revenue by the imposition of charges upon all vessels entering the mouth of the Mississippi river, wherewith she supports her quarantine system and service, while the laws themselves, and the evidence in this case, show that the damages are imposed with the sole purpose of raising this revenue and without rendering, or the intention to render, any service whatever to the ships charged.

That the quarantine service is ably and intelligently conducted there can be no doubt, but this affords no reason for requiring that it should be supported by those who are under no legal obligations so to do.

For these reasons, deeming it unnecessary to consider other points raised, I am of opinion that the injunction herein issued should be maintained and perpetuated at the cost of defendant and the intervention dismissed.

Messrs. Leovy & Kruttschnitt, counsel for plaintiff, Frank C. Zacharie for defendant.

VITAL STATISTICS.

The *American Journal of the Medical Sciences* for January, contains a long and interesting paper by Dr. J. S. Billings on the registration of Vital Statistics, in which is sketched the history of registration in different countries. He remarks that the subject is one of the most important, and at the same time the most difficult, in sanitary as well as in social science, the difficulties being in part due to its apparent simplicity. "Before studying it and attempting to obtain practical results, almost everyone is disposed to think that he understands it, and is quite ready not only to undertake the duties of registrar or census superintendant, but to prepare a law or ordinance regulating the matter. After one has investigated the matter a little, and has become somewhat acquainted with the methods in use, it is not unlikely that he will suppose that he has made some remarkable discoveries of causes of error, imperfect returns, insufficient tabulations, and erroneous conclusions, and will thereupon proceed to prepare a paper criticising the work of his predecessors and proposing reform. It is probable, however, as he continues his studies, that he will find that his discoveries are not new, that there are various practical objections to his proposed improvements, and that it is much easier to confine his essay to denunciation of that which is, than to point out clearly and definitely that which ought to be, and which is at the same time practicable."

He states that the most difficult of all the problems of registration in this country is to obtain a complete record of births, in a given locality, nor can it be said that it has anywhere been completely and satisfactorily solved, referring, we presume, to the United States, since the registration of births is certainly very complete in some European countries. He considers it bad policy to require medical men to furnish reports of births under penalty. It is pointed out that no certificate as to cause of death, which is given to the nearest relative or householder for transmittal will in all cases give the cause of death accurately, and that this can only be secured by some system of confidential report, to be sent by the physician direct to the registrar, which is a strong reason for keeping the physician's certificate distinct from the one giving age, occupation, etc.

"All registration acts which are upon a proper basis presuppose also legislation providing for the determining of those who are properly qualified physicians, and for making the names of these known to the registrar. It may be said, therefore, that the registration of vital statistics depends for its efficiency, to a very large extent, upon some system of registration of physicians and midwives." Attention is called to the fact that there should be as great a correspondence as possible between the census forms and the registration forms, to obtain the best results from each, and also to the great difficulty of making reliable estimates as to the number of living population in a place for any other than a census year. Of the various methods used for estimating population between one census and another no one by itself can be relied on. "The tendency is always to overestimate the number of living population. The number of deaths in a large city is in itself a means of checking such estimate, for whenever in such a city the death rate is reported as being for a whole year less than 17 per 1,000 it may be considered as certain that either the deaths are not all reported or the population is overestimated, the latter being usually the principal source of error."

The paper is one which cannot be summarized and we have merely selected a few specimens. We should have liked to have seen a discussion of the form in which registration statistics should be published. At present there is little uniformity, and some of those published are in such a form as to be of very little value.

The Chicago *Tribune* of Jan. 13th publishes the summary of the report of Health Officer Merki, who has charge of the small-pox records of the city, with the remark that "it discloses that the authorities concealed about eight cases out of ten that occurred in the city." The total number of cases during 1882 was 3,611, of which 1,055 were treated at the hospital. The deaths in the city were 1,010, and at the pest house 282. In 1851, there were 2,997 cases and 1,180 deaths. The number of persons vaccinated in 1882 was 110,915.

The report of health officer of Utica, Dr. James G. Hunt, shows that during the year 1882 there were reported for registration in Utica, 741 births, 218 marriages, and 627 deaths, 70 of the latter being non-residents. He estimates the population at 33,923, which gives an annual mortality of 18.48. The number of deaths under one year of age was 110; between one and five, 59; between five and twenty, 64; between 20 and 60, 245. Consumption caused 106 deaths; pneumonia, 56; bronchitis, 14; cerebro spinal meningitis, 22; diphtheria, 12; scarlet fever, two; typhoid fever, ten; diarrhœal diseases, 50.

The Toronto *Canadian* says that Chief Justice Spragge of that city found a contractor laying rotten cedar blocks in a street pavement, and spoke to the inspector about it, when that official replied that the rotten blocks were as good as the others, as the holes got filled up with gravel. That inspector ought to come to New York. He could easily get a place under the Park Department, the reorganization of which has been made in the interest of the contractors.

Small-pox is raging in Salem, Va. Roanoke College has suspended in consequence, and other towns in its vicinity have quarantined against the place. In Atlanta, Ga., this disease is also said to be rapidly spreading, and among the white population.

The twelve miles of mains laid for the new water works of Madison, Wisconsin, were tested under a water pressure of 125 to 145 pounds, on October 19 and 20. Three leaks occurred on the first day and three on the second.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Jan. 20.....	24.15	18.30	20.66	26.96	29.70	18.76

E. G. LOVE, Ph.D., *Gas Examiner.*

SUGG, BRAY AND SIEMENS.

MT. VERNON, O., *Jan.* 15, 1883.

To the Editor of THE SANITARY ENGINEER:

Please give me the address of Messrs. Sugg, Bray and Siemens through your paper. Their names appear in your last number on improvement in coal gas burners of high candle power, on page 129. Resp'y yours,

E. C. MCCLOY.

[Wm. Sugg & Co., Vincent Works, Westminster, London, Eng. American agents: American Meter Co., 512 West 22d st., New York.

Geo. Bray & Co., Leeds, England. American agents: W. W. Goodwin & Co., 142 Chambers st., New York.

Siemens' Patent Gas light Co., 40 Queen Victoria st., London, E. C., England.

ELECTRIC LIGHT NOTES.

The Sub-Committee of Philadelphia Councils which has under consideration the adoption of an amended ordinance reducing the tax on wires used for electrical purposes, have decided that a tax of $5 per mile shall be placed on all electrical wires above ground and $2.50 on those underground, and $2.50 per mile on telegraph and telephone wires above ground and $1 underground.

Ninety Edison lamps have been placed on the Wilhelmstrasse in Berlin.

A company has been formed for lighting a considerable area in Birmingham, Eng., by electricity. The work will be under the direct superintendence of Mr. Crompton.

The Orange, S. C., cotton mills are lighted with 100 Maxim lamps, supplied by a 100-light Weston dynamo. The light has been in use two months and gives satisfaction. As to cost, the proprietor of the mills estimates interest on the plant at $175; cost of lamps for one year, $150; fuel, $60; total, $385 per annum. The low cost of fuel is explained by the fact that the 120 horse power engine which furnishes power to the mills also runs the dynamo, and the fuel consumed for the lights is estimated on the basis of 15 horse power required for the dynamo four hours each day.

Meter-ites.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. E. F. Loiseau read a paper on artificial fuel. He claims to have succeeded in making compressed fuel suitable for domestic use. The fuel is supplied in egg-shaped lumps weighing about 2 ozs. There are sixty light fuel factories in Europe, but the product is in the shape of bricks, too large for family use.

The councils of Philadelphia on January 18 elected four trustees of the gas works to succeed Messrs. McManes, Bumm, W. H. Smith and Thos. J. Smith. The following were elected: W. W. Alcorn, Thos. H. Gill, William D. Gardner, and William H. Smith who was the only one of the retiring members re-elected.

The past year Philadelphia has manufactured, according to the figures of the Gas Trust, 2,319,898,000 cubic feet of gas; 54,664 feet of street mains were laid during the year, making in all 722.3 miles of mains in the city. There are 12,923 street lamps and 101,958 consumers. The net profits during the year were $510,386.

There is considerable competition for the tar from the Philadelphia Gas Works. One firm now takes the whole amount; this is stated to be about 85,000 barrels annually, at one cent per gallon. Another competitor now offers two cents per gallon to take the whole amount and give security to the city for performance of contract, and third parties elect to take smaller amounts, 10,000 to 15,000 gallons annually. The Trust on the 16th inst. voted to ask for bids for the whole amount.

The revenue of the Parisian Company for lighting and heating by gas in the first eight months of this year amounted to £1,672,635 ($8,360,000), an increase of £642.000 on the previous year. The corresponding revenue collected in the corresponding period of 1881 was £1-544,237, showing an increase of £128,398, or 8.31 per cent. this year.

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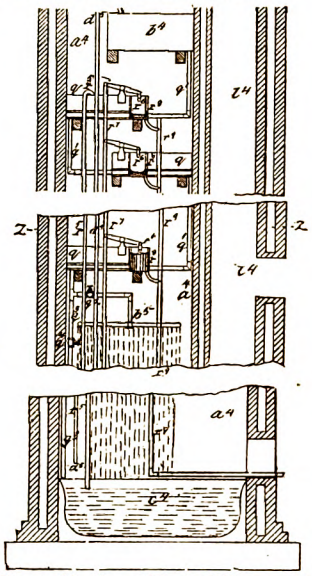
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

265,256. SYSTEM OF PRODUCING AND CONTROLLING CURRENTS OF AIR FOR COOLING, WARMING, VENTILATING, &c. JOHN GAMGEE, London England. Filed Jan. 30, 1882. (No model.) Issued October 3, 1882.



Claim.—1. The combination, with a building provided with suitable air-conduits, of a tower, connected therewith, provided with means for producing ice in the upper part thereof, and for producing and maintaining a downward current of air through the same by the falling of a liquid in showers therein, and with openings connecting the interior of the tower with the conduits of the building for the ingress and egress of the air, and constructed to operate substantially as described.

2. In combination, a tower provided with an ingress-opening at its upper part and egress-openings at its lower part, a building connected thereto by said ingress and egress openings, a series of refrigerating-shelves located in the upper part of said tower and adapted to hold water to be frozen, and a spaying or showering device located beneath the bottom refrigerating-shelf and connected thereto, adapted to shower the refrigerant liquid to the bottom of the shaft after it has passed through the refrigerating-shelves, as and for the purpose set forth.

3. In combination, the shelves $q\,q$, tank b^4, connecting pipes $q^1 q^1$, water-supply pipe r^6 and tower a^4, substantially as and for the purpose set forth.

4. In combination, the shelves $q\,q$, tank b^4, connecting-pipes $q^1 q^1$, water-supply pipe r^6, showering device b^5, and tower a^4, substantially as and for the purpose set forth.

5. In combination, the shelves $q\,q$, tank b^4, connecting-pipes $q^1 q^1$, water-supply pipe r^6, showering device b^5, pipe q^3, and tower a^4, substantially as and for the purpose set forth.

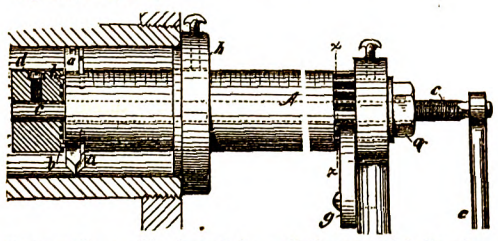
6. The refrigerating-shelves $q\,q$, located in the upper part of the tower a^4, adapted to hold water, and provided with discharge gates or valves r^6, and drip-cups r^8, and pipe r^9, in combination, substantially as and for the purpose set forth.

7. The method of producing currents of air of any desired temperature by the action of a liquid falling in showers in a tower or confined space, in connection with devices adapted to change the temperature of the said currents after the entrance thereof into said tower, substantially as set forth.

8. In the method of producing currents of air by means of liquids showered or caused to fall in drops down through a tower or confined space, the employment of liquids containing in solution or charged with deodorizing or antiseptic agents, whereby the air whose circulation is induced by said falling liquid will by that same liquid be deodorized or purified, substantially as hereinbefore set forth.

9. In the hereinbefore-described system of ventilating and cooling the application and use, as both the refrigerating and the air-current producing agent, of a refrigerating-liquid such as employed in freezing or ice machines, which first exercises refrigerating action upon a cooling or ice-making device, and then is showered or caused to fall in drops through the tower or other confined space, substantially as hereinbefore set forth.

265,086. TUBE CUTTER OR EXPANDER. ABRAM C. HUNSBERGER, Portland, Pa. Filed May 17, 1882. (No model.) Issued September 26, 1882.

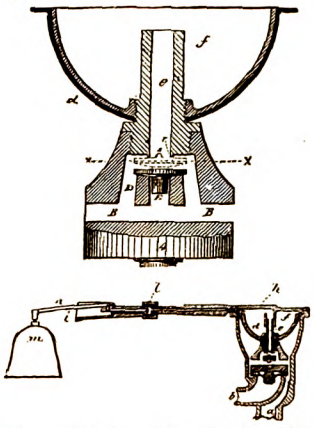


Claim.—The combination of the radially-grooved hollow bar A tools *a*, scroll-block *d*, and screw-threaded rod *c* with the screw-nut *g* for holding the tools *a* in engagement with the scroll of the block *d* as shown and described.

265,306. WATER, GAS, SEWER OR DRAIN PIPE. JOHN P. CULVER, Tucson, Ariz. Filed Septemper 24, 1881. (No model.) Issued October 3, 1882.

Claim.—As a new article of manufacture, an open-ended tube consisting of a sheet of metal rolled or overlapped to form the required diameter, and provided between the folds with solder suitably applied and adapted to set, thereby constituting a homogeneous solid cylinder substantially as set forth.

265,112. WATER CLOSET VALVE. HENRY S. LORD and CORNELIUS BIRKERY, Hartford, Conn., assignors to the Hartford, Sanitary Plumbing Company, same place. Filed July 12, 1882. (No model.) Issued September 26, 1882.

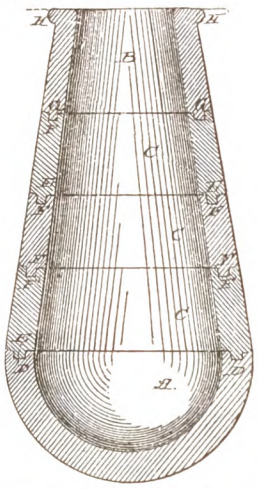


Claim.—1. The combination of the valve by which the flow to the bowl is opened and closed, an escape-passage from above the valve, a valve arranged to operate in connection with said escape-passage to partially close the said passage when the flow of water is admitted and open said passage when the flow is cut off, substantially as described.

2. The valve A, constructed with water-passages B into a chamber, D, the escape-passage *e*, opening into said chamber D, the valve E, arranged in said chamber and below the passage *e*, the said valve arranged to partially close the said passage *e* when the water is admitted and open said passage when the flow is cut off, substantially as described.

265,277. TILE FOR WELLS AND CISTERNS. GEORGE W. OVERALL, Memphis, Tenn. Filed May 27, 1882. (No model.) Issued October 3, 1882.

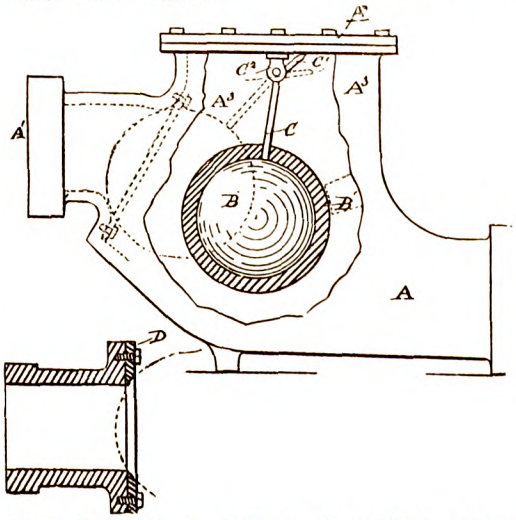
Brief.—The curbing is made in sections, the lowermost bowl-shaped, those above it tapering and ring-shaped. The joints (tongue and groove) are made tight by cement.



Claim.—1. A cistern consisting of a bowl-shaped bottom section, tubular tapering intermediate sections, and a top section, all constructed and arranged substantially as set forth.

2. The herein described cistern-curbing consisting of the bowl-shaped bottom section, A, having groove D, one or more tubular tapering intermediate sections, C, each having a tongue or flange, E, and groove F, and the top section, B, having tongue G and rim H, as and for the purpose set forth.

265,310. FLOOD VALVE FOR DRAINS. FREDERICK DYER, Camden Town, County of Middlesex, England. Filed Feb. 7, 1882. (No model.) Patented in England, Sept. 23, 1881, No. 4,115. Issued Oct. 3, 1882.

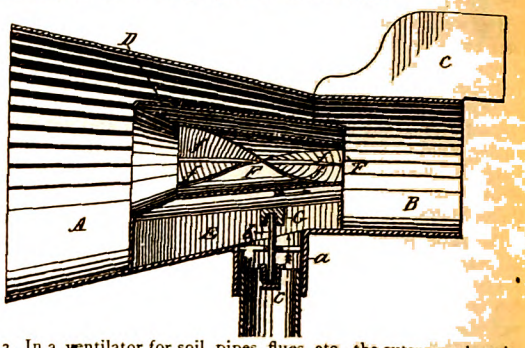


Claim.—In a flood valve for drains, the combination, with the drain A, provided with a valve seat, D, of the spherical float valve B, rigidly connected with a lever, C, bent to form a stop, C^1, whereby said valve is pivotally suspended in the drain pipe and prevented from assuming a vertical position, substantially as and for the purpose specified.

365,322. VENTILATOR. PETER H. JACKSON, San Francisco, Cal. Filed July 20, 1882. (No model.) Issued Oct. 3, 1882.

Claim.—1 In a ventilator for soil pipes, flues, etc., an outer casing and an inner casing, open at both ends and forming air passages, in combination with an intermediate casing closed at its forward end and open at its rear end, forming between itself and the inner casing a space or passage between the two air passages, and in relation with the soil pipe, flue, etc., substantially as and for the purpose herein described.

2. In a ventilator for soil pipes, flues, etc., the outer or main conical casing, A, in combination with the casing D and the central casing, F, between which and casing D a space is formed closed at the front and open at the rear, and a connecting casing, E, opening from the soil pipe or flue into the space between the casings D and F, substantially as and for the purpose herein described.

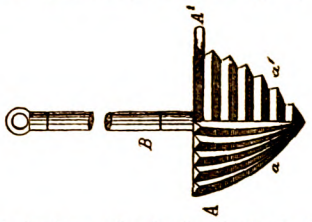


3. In a ventilator for soil pipes, flues, etc., the outer or main conical casing, A, in combination with the conical or tapering casings D and F, between the walls of which a space is formed closed in front and open at the rear, said casing F having spiral flanges *f* upon its inner surface, and a connecting casing opening from the soil pipe into the space between the casings D and F, substantially as and for the purpose herein described.

4. In a ventilator for soil pipes, flues, etc., the outer or main conical casing, A, and the interior casings D and F, between the walls of which an open space is formed, in combination with the connecting casing E, having sloping sides and a pointed or beveled front, substantially as and for the purpose herein described.

5. In a ventilator for soil pipes, flues, etc., the conical or tapering inferior casing, F, having spiral flanges *f* upon its inner surface, in combination with the surrounding tapering casing D, forming a space between its inner wall and casing F, closed in front and open behind, and a connecting casing E, joining said space with the soil pipe, substantially as herein described.

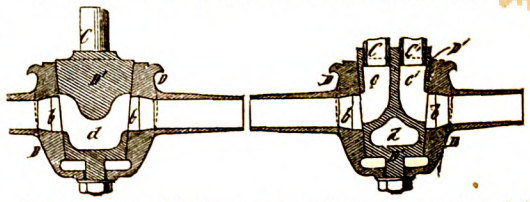
265,319. IMPLEMENT FOR CLEANING WATER CLOSET BOWLS. LEWIS O. HOWELL, JR., Philadelphia, Pa. Filed June 28, 1882. (No model.) Issued Oct. 3, 1882.



Claim.—1. An implement for cleaning the bowls of water closets, consisting of an inverted corrugated or ribbed cone constructed of flexible material, as set forth, said cone being provided at its base with a handle, substantially as shown and described.

2. In an implement of the character herein specified, corrugated or ribbed inverted cone A, bearing lip A^2, core A^1, and handle B, the whole combined and arranged to operate substantially as shown and described.

265,327. WATER METER CONNECTION. JULIUS JONSON, New York, N. Y., assignor of one-half to Julius Elson, same place. Filed Aug. 23, 1881. (No model.) Issued Oct. 3, 1882.



Claim.—The combination, with a service cock composed of a shell having a straight water way and a plug having a direct water way ranging with that in the shell, and also having water ways with that ranging with that in the shell, and leading through the head of the plug, of pipes extending from the water ways in the head of the plug and a water meter having said pipes connected, one with its water inlet and the other with its water outlet, substantially as and for the purpose specified.

265,234. APPARATUS FOR HEATING WATER FOR BOILERS, &C. GEORGE H. BABCOCK, Plainfield, N. J., and Stephen Wilcox and Nathaniel W. Pratt, Brooklyn, N. Y. assignors to the Babcock & Wilcox Company, New York, N. Y.. Filed September 3, 1881. (No model.) Issued October 3, 1882.

264,946. VAPOR STOVE. WILLIAM HESTON, Mount Union, Ohio. Filed, Aug. 18, 1882. (No model.) Issued September 26, 1882.

264,980. REGULATOR FOR ELECTRIC GENERATORS. EDWARD WESTON, Newark, N. J., assignor to the U. S. Electric Lighting Company, New York, N. Y. Filed May 8, 1882. (No model.) Issued September 26, 1882.

265,049. ELECTRIC-ARC LAMP. JOSEPH R. FINNEY, Pittsburg, Pa. Filed May 3, 1882. (No model.) Issued September 26, 1882.

265,261. PUMP. WILLIAM D. HOOKER, St. Louis, Mo. Filed Dec. 15, 1881. (No model.) Issued October 3, 1882.

265,283. WATER FILTER. LUTHER B. SANBORN, Freeport, Ill. Filed November 5, 1881. (No model.) Issued October 3, 1882.

265,284. CAR HEATING APPARATUS. DANIEL D. SEWALL, Augusta, and JAMES H. SEWALL, Portland, Me. Filed April 27, 1882. (No model.) Issued October 3, 1882.

265,292. ELECTRIC-LAMP SUPPORT. WILLIAM WHEELER, Concord, Mass. Filed February 13, 1882. (No model.) Issued October 3, 1882.

265,311. ELECTRIC LAMP AND HOLDER FOR THE SAME. THOMAS A. EDISON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Feb. 5, 1880. Renewed Aug. 14, 1882. (Model.) Patented in England Feb. 10, 1880, No. 578; in Italy Apr. 28, 1880; in Belgium Apr. 30, 1880, No. 51,155; in Victoria June 15, 1880, No. 2,842; in France June 16, 1880; No. 136,088; in India, June 23, 1880, No. 415; in Sweden, June 25, 1880; in Canada July 19, 1880; No. 11,520; in New South Wales July 26, 1880; in Queensland Aug. 3, 1880; in Austria-Hungary Aug. 30, 1880; in Portugal Sept. 22, 1880, 621; in Norway Sept. 24, 1880; in New Zealand Oct. 18, 1880, No. 484; in Russia Dec. 14, 1881; in Germany Dec. 31, 1881; No. 15,602, and in Spain Jan. 2, 1882. Issued Oct. 3, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JANUARY 13, 1883

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
North Atlantic Cities.																							
Portland.....Maine	34,519	11	16 1	2	18.1																		
Boston.....Mass	407,581	187	23.4	46	24.5	8		38	4	3	11	1	3		3	16	1	5		1	1		
*Cambridge.....Mass																							
Worcester.....Mass	64,995	30	23.9	11	36.6	1	1	4			1					1		2		1			
*New Haven.....Conn																							
Providence.....R. I.	114,723	49	21.8	17	34 6			7			3		1			12		1					
Total	621,818	277	23.1	76	27.4	9	1	49	4	3	15	1	4		3	29	1	8		2	1		
Eastern Cities.																							
Albany.....New York	98,430	55	28.6	23	41.8			7	2		2		3		3	2	1	1		3			
New York.....New York	1,299,249	683	27.0	236	34.5	21	1	120	22	12	20	3	3	6	20	92		33		16	12		9
Brooklyn.....New York	633,763	232	18.7	84	36.2	6		28	9	4	14	1	1	7	15	22			1		4		2
Hudson Co.....New Jersey	228,025	127	28.9	26	20.4	5		22	1		3	2	2		5	28	1	8			4		
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	27	25.9	12	44.4	1		3	2		1					3							
Philadelphia.....Pa.	907,043	390	21.8	149	38.2	3	1	42	18		22		15		11	42	10	15		3		10	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	24	26.5	7	29.1			1														1	
Total	3,267,411	1,538	24.4	537	34.2	36	2	223	54	16	62	6	24	13	54	189	12	57	1	22	20	11	12
Lake Cities.																							
Buffalo.....New York	168,702	73	22.4	27	36.9	3	3	10	3		4	2	1		6	6	1		1		2		
Rochester.....New York	92,116	26	14.5	7	26.9		1	4			2		2			1							
Syracuse.....New York	54,696	16	15.1	3	18.7	2		4		2				1		1							
*Cleveland.....Ohio																							
Detroit.....Michigan	131,118	51	19.7	22	43.1			7	2	1	7		1		1	3		1					
Chicago.....Illinois	597,834	220	19.1	102	46.3	5	4	21	8	2	17	1	5	2	8	18	3	10	1		4	5	4
Milwaukee.....Wisconsin	135,233	48	18.2	24	50.0			4			1	1			2	4	1	2					1
Total	1,179,204	434	19.1	185	42 6	10	8	50	13	5	31	4	9	3	17	33	5	13	2		6	5	5
River Cities.																							
Allegheny.....Pa.	89,038	21	11.9	12	57.1			1			2		1			2		2					2
Pittsburgh.....Pa	191,523	76	20.3	21	27.6	9		11		1	2		9			5	1	1			2	2	3
Cincinnati.....Ohio	267,767	115	21.8	45	39.1			18	3	1	2		4		7	13	3	5	1	3	2		5
Dayton.....Ohio	41,648	10	12.5	2	20.0						2					1					1		
Louisville.....Ky.	131,529	44	17.1	13	29.5	1		7			1		2	1		7						4	1
Indianapolis.....Indiana	86,529	21	12.5	8	38.0	1		7	1							3	1						1
Terre Haute.....Indiana	30,464	5	8.3	2	40.0			2					1										
*Minneapolis.....Minn																							
St. Paul.....Minn	53,683	19	18.3	6	31.5		2	3			3					2	1	1					
*St. Louis.....Mo																							
Total	892,181	311	18.1	109	35.0	11	2	49	4	2	12		17	1	7	33	6	9	1	3	5	6	12
Southern Cities.																							
District of Columbia.. " " Wh.	136,471	37	14.1	13	35.1			11			1				2	3	2						
" " Col.	71,108	31	22.6	15	48 3			7					1	1		2	1	1	1				1
Richmond, Va. Wh.	38,526	18	24.3	3	16.6	1		2					1			2		2					1
" " Col.	29,394	22	38.9	5	22.7		1	5					1	1	1	2		1			1		
Charleston, S. C. Wh.	22,699	9	20.9	1	11.1			1								1	1						
" " Col.	27,595	16	29.6	5	31.2			2					1				1						
Atlanta, Ga. Wh.	25,583	4	7 8	2	50.0			2															
" " Col.	19,221	7	18.7	5	71.4		1	1															
Savannah, Ga. Wh.	15,041	13	45 0					2								2				1			
" " Col.	16,506	9	28.3					2		1		1											
Nashville, Tenn. Wh.	31,993	10	16.1					1					1			2		1				1	
" " Col.	19,406	5	11.0	1	20.0	1		2														1	
Memphis, Tenn. Wh.	18,677	8	21 8	2	25.0			1						1		1							
" " Col.	14,896	14	48.4	5	35.7	1	1	1						1		2	1						
*Mobile, Ala. Wh.																							
" " Col.																							
New Orleans, La. Wh.	163,757	81	25 7	14	17.2	4		10			1		2	2	1	9		1				3	
" " Col.	59,866	39	33.9	12	30.7			2								5		2			1	10	
Total White	452,747	180	20.6	35	19.4	5		30			2		4	3	3	20	3	4		1		4	1
Total Colored	267,987	148	28.8	48	33.5	2	3	22		1		1	3	3	1	11	8	4	1		2	11	1
Total in 33 U. S. Cities	6,671,348	2,883	22.4	990	34.4	73	16	423	75	27	121	12	61	23	85	315	30	94	5	28	34	37	31
Dec. 23—Total in 28 English Cities	8,469,571	4,480	27.6			143				47	24		85		100					110		6	106
Dec. 30, " 28 " "	8,469,571	4,036	24.9			127				43	17		74		92					88		6	90
Dec. 30, " 8 Scotch Cities	1,219,586	707	30.1			15				16	15		21		16			199		9			35

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending January 13, in 33 United States cities containing an aggregate population of 6,671,348, there died 2,883 persons, which is equivalent to an annual death rate of 22.4 per 1,000; an increase over the two preceding weeks for which the rate was 21.3 per 1,000. In the North Atlantic cities the rate was 23.1; in the Eastern cities 24.4; in the Lake cities 19.1; in the river cities 18.1; and in the Southern, for the whites 20.6, and for the colored, 28.8 per 1,000.

Sixteen cases of cerebro-spinal meningitis are reported, scattered through every section, but mainly in the Lake Cities. Probably none of these cases belong to the true cerebro-spinal, or spotted, fever. Small-pox is increasing in Philadelphia, and 13 deaths from it are reported in New Orleans. It is prevailing in a number of smaller towns in Tennessee.

LOUISVILLE, KY.—Dr. Montgomery reports ten new cases of small-pox, with three deaths from this disease in hospital and one death in the city.

WILMINGTON, DEL.—Dr. E. B. Frazer reports 13 cases of small-pox during the week.

DETROIT, MICH.—Dr. O. W. Wight reports 41 cases of scarlet fever and 45 of diphtheria.

BALTIMORE, MD.—The total number of deaths reported during the week ending January 13 was 270, an increase of 101 over the corresponding week of 1882. Births reported during the week 138. The deaths from small-pox were 83, 21 of them adults and 62 minors. This is an increase of four over those reported the week previous, and is four less than the increase for the week before that. Of those who died, 168 were white natives of the United States, 71 colored, and 31 foreign. Died under five years of age, 105; between five and twenty years, 56; between twenty and forty, 52; between forty and sixty, 25; between sixty and eighty, 28; between eighty and ninety, three; between ninety and one hundred, one. The principal causes of death were, Small-pox 83, consumption 29, diphtheria 19, pneumonia 15, disease of the heart and scarlet fever each nine, convulsions seven, croup five, apoplexy, Bright's disease, erysipelas, typhoid fever, hemorrhage of the lungs, old age and paralysis, each four; congestion of the lungs, inflammation of the kidneys, inflammation of the tonsils and meningitis, each three; dentition, malarial fever, typhoid malarial fever, inanition, inflammation of the bronchi, malformation, marasmus, trismus, nascentium and whooping cough, each two.

There are at least 450 cases of small-pox in the city. General vaccination is now being vigorously pushed and its effects should soon become manifest in a marked diminution of the epidemic. Had this vaccination been carried out four months ago, Baltimore would now probably be free from this disease.

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MICHIGAN.—Dr. Baker's report for the week ending January 6 shows the diseases in their order of prevalence to have been as follow: consumption, rheumatism, bronchitis, tonsilitis, neuralgia, intermittent fever, pneumonia and influenza. Consumption, erysipelas, measles, pneumonia and bronchitis increased in their area, while diphtheria and neuralgia considerably decreased. Diphtheria was reported present at 18 places, scarlet fever at 15 places and measles at 12 places. Small-pox was reported in Richmond, Osceola Co., and in Royalton, Berrien Co., January 4.

BOSTON, MASS.—C. E. Davis, Jr., reports 43 cases of diphtheria, 22 of scarlet fever and eight of typhoid fever. During the year 1882 there were 8,995 deaths in the city of Boston, which is equal to 21.91 per 1,000 living. Under five years 3,150. Accidents, etc., caused 414 deaths, cerebro-spinal meningitis 24, consumption 1,579, croup 117, diarrhœal diseases 950, diphtheria, 458, erysipelas 40, typhoid fever 212, malarial fevers three, scarlet fever 75, pneumonia 681, bronchitis 373, measles 25, puerperal fever 75, small-pox eight, and whooping cough 92 deaths.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 16 new cases of scarlet fever and two of diphtheria. The deaths (22 reported to date) occasioned by the burning of the Newhall Hotel are not included in the mortality table.

ROCK ISLAND, ILL.—Dr. Craig reports but one death for the week.

NEW ORLEANS, LA.—The report for the week ending January 6 shows 163 deaths; white 116, colored 47; males 82, females 81; under five years, white 18, colored nine; over 60 years, white 15, colored ten. Annual rate 38.25, of white population 37.26, of colored 41.27. Small-pox caused 11 deaths, scarlet fever two, typhoid fever three, malarial fevers six, diphtheria one, puerperal fever one, consumption 17, croup one, acute bronchitis three, pneumonia 11, pleurisy three, and accidents, etc., seven deaths.

CAMDEN, N. J.—Dr. H. F. Palm reports 12 deaths for the week ending Jan. 6. Nine of the decedents were under five years of age. One death is attributed to each of the following causes:—consumption, diphtheria, typhoid fever, scarlet fever and pneumonia.

RICHMOND, VA.—Dr. J. G. Cabell reports Jan. 13th the occurrence of five cases of small-pox during the previous two weeks.

SAVANNAH GA.—Dr. McFarland reports for the week ending Jan. 6th, a total of 15 deaths; whites, 12, colored three. Of the diseases given in our table, consumption caused the death of two white people; diarrhœal diseases and pneumonia caused one death each among the colored population. No deaths under five years are reported.

The report for the previous week (ending Dec. 30), has also been received. The deaths numbered 14; white, six, colored, eight; under five years none are reported. Among the white people, consumption caused one death, typhoid fever, one, and pneumonia two. Among the colored people, consumption caused one death, diarrhœa one, and pneumonia one death.

BUFFALO, N. Y.—Dr. Phelps report for the week ending Jan. 6, was received too late to admit of tabular insertion. There were 58 deaths, 18 of which were of children under five years. Accidents caused five deaths, cerebro-spinal meningitis, three; consumption, four; diarrhœa, two; diphtheria, two; erysipelas, three; typhoid fever, two; scarlet fever, eight; pneumonia, seven; and puerperal fever, one death.

ROCHESTER, N. Y.—Dr. Sheehan concludes his report for the month of December as follows:—

"*It is gratifying to be able to announce a decrease in the number of deaths from diphtheria during the latter half of the past month. Between the 1st and 16 ult. 14 deaths were reported from this particular cause, against six for the period intervening between the 16th and the 31st. Very few severe cases are now known to exist, yet enough to spread the disease if the efforts at isolation, so willingly practiced of late by physicians and people, are relaxed. Facts have come into the possession of the board of health which prove beyond doubt that diphtheria is carried from one house to another, both by exposed persons and infected clothing. The action of the principal who temporarily dismissed from the junior grade some very young children recently exposed to diphtheria, is highly commendable. Her conduct under the circumstances was in strict conformity with the instructions of the board of health. Apart from diphtheria, which produced the highest mortality, the city is remarkably free from contagious and infectious diseases.*"

An abstract of this report will be given when the monthly reports from certain other localities have been received.

NASHVILLE, TENN.—Dr. Richard Cheatham's report for the year 1882 shows 1,085 deaths to have occurred. White males, 252; females, 255; colored males, 282; females, 296; under one year of age, 207. Rate for white population, 17.82; for colored, 34.50. Croup caused 14 deaths; diarrhœa, 13; dysentery, 34; malarial fever, 34; scarlet fever, 16; typhoid fever, 27; cerebro-spinal fever, seven; small pox, 11; cholera infantum, 27; cholera morbus, two; whooping cough, 18; consumption, 180; bronchitis, six; pneumonia, 63; congestion of the lungs, 14; old age, 37; and violence, 45.

At a meeting of the City Board of Health, Jan. 8th, a thorough house-to-house vaccination was suggested.

LANSING, MICH.—The mortality report from this city for the year ending Dec. 31, 1882, furnished by Dr. H. B. Baker, shows 84 deaths in a population of 8,319, or 10.10 per 1,000. Of the decedents, 47 were males and 36 females; 38 were under five years of age, and 12 over 60 years. Accidents caused 56 deaths; cerebro-spinal meningitis, one; cholera infantum, eight; consumption, 9; croup, one; diarrhœa, one; diphtheria, five; erysipelas, one; intermittent fever, one; typhoid fever, two; scarlet fever, five; pneumonia, seven; congestion of lungs, one; and puerperal diseases, one death.

TORONTO, CANADA.—Consul Wm. C. Howell's reports for the week ending Jan. 13, 32 deaths and 38 births in a population or 85,000. The only diseases reported as prevalent are those attendant upon cold weather.

ONTARIO, CAN.—The Bulletin of the Provincial Board of Health for the week ending Jan. 6 shows bronchitis, influenza, anæmia, neuralgia, tonsilitis, consumption and rheumatism as the prevalent diseases. Small-pox is reported from several localities among lumber men and railroad laborers.

VERA CRUZ, MEXICO.—The report for the month of December shows 132 deaths; males 84, females 48. The births numbered only 42. Yellow fever caused 12 deaths, acute lung diseases 18, malarial diseases six, and diarrhœa and dysentery 12 deaths.

DEMERARA, BRITISH GUIANA.—Consul Philip Figyelmesy transmits the returns of the Registrar-General from Georgetown and New Amsterdam for the month of November:

GEORGETOWN.—Births 138; deaths 158; population 47,175. Malarial fevers caused five deaths, diarrhœa and dysentery 18, consumption 36, acute lung diseases three. No deaths occurred from small-pox, diphtheria, measles or whooping cough.

NEW AMSTERDAM.—Births 15; deaths 20; population 8,124. The death causes were similar to those operating in Georgetown.

BUENOS AYRES, ARGENTINE REPUBLIC.—Consul E. L. Baker reports 638 deaths during the month of October. Small-pox caused 45 of the deaths. Mr. Baker says that this disease has become so prevalent as to be epidemic, while gastric, intermittent and typhoid fevers are very general. The sanitary condition of the city continues bad, yet notwithstanding the warmer weather the public health seems to be as good as during the previous month.

RIO DE JANEIRO, BRAZIL.—Deputy Consul General James H. Murray reports 233 deaths during the week ending Dec. 9, of which 47 were caused by small-pox, 14 by pernicious fever and 35 by consumption. The recent introduction of water Into the houses of the city by the Government is expected to prove of great sanitary value.

MARANHAO, BRAZIL.—Reports for nine weeks ending Dec. 9 have been received from J. J. Tavares, U.S. Consul. During the third of these weeks, ending Oct. 28, a few cases of small-pox occurred. During the two weeks which followed the disease was reported as increasing, but no deaths were announced. In the week ending Nov. 4, there were four deaths from small-pox, and the disease was reported as taking on an epidemic character, and during the next three weeks there were respectively five, ten and 17 deaths.

PERNAMBUCO, BRAZIL.—Consul Henry L. Atherton sends reports for the weeks ending Dec. 11 and 18, eight deaths from small-pox occurred in each week. The disease has not been declared epidemic and no precautions are yet taken to prevent its spread; the patients are not even isolated.

VALPARISO, CHILE.—Vice Consul August Moller, Jr., reports 530 deaths for the month of November in a population of 120,000. Acute lung diseases caused 69 deaths, fevers 113, small-pox 37, and consumption 63 deaths. Mr. Moller transmits the following vital statistics from the twenty-second volume of the *Anuario Estactistico* of the Republic, for the year 1881. "The population of Chile on Dec. 31, 1879, was calculated to be 2,183,434 inhabitants, and on Dec. 31, 1880, 2,199,180, an increase of 15,746 against 28,405 in 1879. The number of baptisms in 1880 was 43,489 males, and 42,293 females. The deaths were 35,261 males and 34,775 females. The number of qualified voters is given at 142,133. During last autumn small-pox spread over all the country and made numerous victims. It is still very prevalent and shows no signs of abating. In 1881, 83,499 persons were vaccinated; and with the object of stimulating the public vaccinators, an order was issued entitling them to one dollar a day when called to a distance of upwards of four kilometers from their place of residence.

ENGLAND.—The return of the Registrar General for the week ending Dec. 23 gives the average mortality in 28 large towns as 27.6 per 1,000. The lowest rate 20.0 was registered in Derby, the highest 40.1 in Liverpool. The rate in London was 27.1. The 24 deaths from diphtheria in the 28 towns, included 12 in London, two in Liverpool, and two in Halifax. Small-pox caused four deaths in London and its outer ring of suburban districts, two in Newcastle-upon-Tyne, and one in Wolverhampton. In London there were 2,728 births and 2,019 deaths. Allowing for increase in population, the births exceeded by 192, and the deaths by 122, the average numbers in the corresponding weeks of the last ten years. The present high mortality rate is in large part due to an increase in acute lung diseases. There were 66 deaths from measles, 48 from scarlet fever, 12 from diphtheria, 38 from whooping cough, 25 from enteric fever, 22 from diarrhœa and dystentery, and none from typhus or simple cholera.

For the week ending Dec. 30 the average rate in the 28 towns was 249; lowest rate in Portsmouth 16.9, highest in Sunderland 37.7. In London the rate was 23.0. The 17 deaths from diphtheria in the 28 towns, included 12 in London and 3 in Manchester. Small-pox caused two deaths in London, two in Newcastle-upon Tyne, one in Nottingham, and one in Sunderland. The births in London numbered 2,132 and the deaths 1,710, the former being 161 and the latter 218 below the corresponding weeks of the past ten years. There were registered 56 deaths from measles, 47 from scarlet fever, 20 from whooping cough, one from typhus, 15 from typhoid fever, 19 from diarrhœa and dystentry, and one from simple cholera.

DUBLIN, IRELAND.—From Dr. Charles A. Cameron's report for November, we learn that the death rate which was 25.43 in October rose to 27.4. Whooping cough, typhus fever, typhoid fever and diarrhœa and dysentery were the zymotic diseases most fatal during the month, but none of them assumed serious proportions; in fact, the zymotic death rate was less than one-half of the average rate during the previous ten years.

SCOTLAND.—Consul J. A. Leonard, of Edinburgh, transmit the return of the Registrar General for the week ending Dec. 30, a summary of which is embraced in our table. The death rate in the eight principal towns was 30.1 or 5.4 above the corresponding week of the previous year. The lowest mortality was accorded in Aberdeen 22.7, the highest in Dundee and Perth 36.1 per 1,000. Whooping cough was the most fatal miasmatic disease in Glasgow and Dundee. The rate in Edinburgh was 24.4.

ST. PETERSBURG, RUSSIA.—Consul General Edgar Stanton reports 613 deaths during the week ending Dec. 16; males 332, females 281; under five years, 314; over 60 years, 65. Typhoid and scarlet fevers, diphtheria and small-pox are prevalent. Small-pox caused 23 deaths.

ROTTERDAM, NETHERLANDS.—Consul J. F. Winter's report for the week ending Dec. 23 shows 113 deaths in a population of 157,270. Eleven cases of small-pox are reported, one of which was fatal.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 71 deaths for the week ending Dec. 16, in a population of 174,706. Males 35, females 36. Measles caused four deaths, scarlet fever one, typhoid fever three, whooping cough two, diphtheria three, croup one, bronchopneumonia 11, consumption 13, diarrhœa eight and violence one.

COPENHAGEN, DENMARK.—During the weeks ending Dec. 5, 12 and 19 there were 106, 100 and 113 deaths. There were in the last-named week ten cases of measles with one death, 30 of scarlet fever with one death, 13 of diphtheria with two deaths; 43 of whooping cough with two deaths, and 91 cases of acute intestinal catarrh with seven deaths.

VENICE, ITALY.—Vice Consul Wm. H. DeWolf Budd reports 79 deaths for the week ending Dec. 23. Small-pox has appeared in one of the suburbs about half a mile from the city proper; 250 cases have been reported with six deaths.

MARSEILLES, FRANCE.—The report for November shows the occurrence of 828 deaths in a population of 360,099, or 77 more than in the corresponding month of the previous year. Of the decedents 443 were males and 385 females; 236 were under five years and 210 over 60 years. Typhoid fever caused 39 deaths; measles six, whooping-cough one, scarlet fever two, small-pox 20, croup and diphtheria 38, consumption 111, bronchitis 17, pleurisy three, pneumonia 106, pulmonary congestion six, pulmonary emphysema 35, puerperal diseases nine, and violence 17 deaths. Small-pox was stationary during the month; measles, scarlet fever and typhoid fever decreased; croup and acute lung diseases greatly increased.

BRUSSELS, BELGIUM.—The Bulletin for the week ending December 23 shows the occurrence of 278 births and 167 deaths in the city and suburbs, equivalent to annual rates of 35.1 and 21.5 respectively. Deaths under five years 56. There were no deaths from scarlet fever or diphtheria. Small-pox caused three deaths, measles two, typhoid fever two, croup four, whooping-cough one, diarrhœal diseases ten, bronchitis and pneumonia 30, and consumption 22.

FOOCHOW, CHINA.—Vice-Consul J. P. Cowles, Jr., reports Nov. 30, the presence of cholera among the native population. The doctors hesitate in pronouncing the disease true cholera, although some patients have died after six hours of vomiting and purging.

BATAVIA, JAVA.—Consul Oscar Hatfield, under date Nov. 27, states that Sourabaya has now been declared free from all epidemic sickness, and that no further cholera reports will be issued by the authorities.

SINGAPORE, INDIA.—Consul A. G. Studer reports five cases of small-pox, as having occurred in the colony during the week ending Nov. 27. Two of them proved fatal.

CALCUTTA, BRITISH INDIA.—Consul General Mattson reports 338 deaths for the week ending Dec. 2. This is equal to an annual rate of 40.7. The mortality from cholera is high, 74 deaths having occurred. Fever caused 101 deaths, diarrhœa 42, tetanus 23, consumption 13 and violence 4.

MADRAS, BRITISH INDIA.—Consular Agent L. Strange reports 345 births and 304 deaths for the week ending Dec. 8. Birth rate 45.2; death rate 39.8. Small-pox caused one death and measles one; fevers 91, dysentery 21, and diarrhœa 13. No deaths from cholera are reported.

BOMBAY, INDIA.—Consul B. F. Farnham transmits reports for the weeks ending November 28 and December 5. During the former there were 415 deaths, or 55 less than the mean of the corresponding period in the preceding five years. Annual rate 26.09. Remittent fever caused 82 deaths, acute lung diseases 66, diarrhœa 18, and dysentery eight. The births numbered 332.

During the latter week there were 414 deaths and 360 births. Remittent fever caused 77 deaths, and lung diseases, diarrhœa and dysentery 59, 31, and 17, respectively.

COLOMBO, CEYLON.—Reports for the three weeks ending Nov. 25, and Dec. 2 and 9 give the deaths from small-pox as nine, three and one respectively, and the cases are 30, 11 and 21.

The report of the Registrar General of Ceylon, for the quarter ending Sept. 30, shows a large excess of births over deaths; the former numbered 17,516 the latter 12,624. In the corresponding quarter of 1881 there were 17,177 deaths. Fever occupies the first place in the mortality list, having caused 2,179 deaths; dysentery follows with 1,496 deaths. Of 88 deaths from small-pox, 68 were in the Colombo district and chiefly within the municipal area. One death is reported as having been caused by the sting of wasps.

The *Medical Record* begins its twenty-third volume by increase of size and general improvement in its appearance. It ranks foremost among the journals devoted to medicine in the United States.

We have received the New Year's number of "The Hub," a monthly journal devoted to the carriage making and accessory trades. The elegance and thorough editing of this journal are remarkable among trade journals. Its contents are classified into departments such as "Body Shop," "Smith Shop," "Paint Shop," and "Trimming Shop," each under competent practical editorship. The number before us contains several handsome colored plates drawn to scale and the whole makes a valuable publication.

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Construction Notes.

We shall always be glad to receive items of interest for this column.

FORT PLAINS, N. J.—New York City parties have offered to put in water works and guarantee an adequate supply if the village will give them the proper authority.

THE APPLETON, Wis., *Post* has issued a large sheet, containing a review of the progress of that city during the past year, from which we learn that the Board of Public Works has wisely adopted a complete plan of sewerage, according to which all future sewers and drains are to be constructed. The plans were prepared by Rudolph Hering, C. E. Provision has also been made for the water supply of the city, through a contract with a private company which has begun the construction of works, taking the supply from an artesian well 440 feet deep in Potsdam sandstone. The water will be pumped directly into the mains by Worthington pumps, the motive power being both steam and water.

PHILADELPHIA, PA.—At the meeting of the Council Committee on Survey, a report was received from the subcommittee on main sewers, recommending the construction of the following sewers: The continuation of the Mill Creek sewer, from Meadow to Market streets, which is estimated will cost $48,000; one on Snyder avenue between 13th and 16th streets, to cost $18,000; on 16th street a branch sewer to the main sewer on Snyder avenue at a cost of $5,000. At foot of Vienna street, to cost $13,500; on Washington avenue from Delaware river to Tulip street to cost $7,600.

BUFFALO.—The *Commercial Advertiser* has recently noticed the progress of the new intercepting sewer work which is to be done on plans submitted by Col. George E. Waring, who has been engaged by the Sewer Commissioners as consulting engineer during the progress of the work, which is estimated to take two years. It appears that draughtsmen are engaged on the plans of the sewer, while the specifications are being prepared by Col. Waring. Bids will be advertised for in a few weeks and it is hoped to break ground as soon as the weather will permit.

PROVIDENCE, R. I.—The annual message of Mayor William S. Hayward, of Providence, R. I., reviews the city work and finances for 1882. The total funded debt on September 30, 1882, was $9,697,688.22, of which $5,500,000 is for the water works, and $997,250 for sewers. The erection of the new Corliss engine has relieved the danger of possible breaking down of the only means of supplying water. The total expenses of the water works since 1872 have been $8,740,430 and the receipts have been $2,438,191.

There are 45 miles of sewers in the city. The City Engineer, Samuel M. Gray, M. Am. Soc. C. E., is preparing plans for the disposal of sewage and will conduct experiments on the best method during the coming summer.

LANSINGBURGH, N. Y.—The Board of Trustees will soon put the matter of constructing sewers in several cross streets to popular vote. It is proposed to construct eight sewers at a total cost of $43,000, to be paid in four years, one-third assessed on property benefited, and two-thirds on the village at large.

NEW YORK.—The Building Committee of the Cotton Exchange have been instructed to reconsider the advisability of constructing the new Exchange at once.

NEW UTRECHT, L. I.—The Earle sewer bill has passed the State Legislature; it places the drains and sewers of New Utrecht and the Dykes Meadows under the charge of the town board of health.

CINCINNATI, O.—The number of building permits issued in Cincinnati during the year was 701; but these show neither the number nor value of the building erected, since they are issued only when streets are occupied and then only on a nominal valuation. This often does not amount to more than ten per cent. of the cost. From other sources the Board of trade has been able to make an approximate estimate, and in round numbers the value of buildings erected last year was $10,000,000.

(Continued on page 184.)

The publisher of THE SANITARY ENGINEER will esteem it a favor if names of persons likely to be interested in the journal are sent to him, in order that he may send them specimen copies.

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CONSTRUCTION NOTES.

(Continued from Page 183.)

BRADFORD, PA.—We clip the following from *Engineering News*: Two plans have been submitted by J. Opperman, City Engineer, to the Water Commissioners. Plan "A" includes an impounding reservoir of five million gallons capacity, located 43 feet above, and connected by a 10-inch pipe, with a distributing reservoir; a 14-inch main leads from the last to the head of Main street in the city, 217 feet below; this represents a static pressure of 94 lbs. per square inch, or deducting friction, 84 lbs. available pressure. The estimated cost of Plan "A" is $58,741.00.

The impounding reservoir in Plan "B" has its high water level 155 feet above Main street, distance $3\frac{1}{10}$ miles. With a 10-inch main this would give a static pressure of 67 lbs., deducting friction, 50 lbs. per square inch. To provide for fire service a 10,000-barrel iron tank is located on a hill 260 feet above Main street, with a six-inch supply pipe leading to present pump station, and a 10-inch pipe connecting with 10-inch main now laid on Bushnell street. Plan "B" is to cost $48,553. The distribution system is estimated to cost in addition to either of above plans $63,470.00.

The Holly Manufacturing Co. submitted a proposition to furnish a complete system of water works for $97,602, including 11 miles pipe and 60 hydrants.

As Mr. Opperman's plans propose 13 miles of pipe and 74 hydrants, the Water Commissioners recommend the adoption of Plan "A" of the latter gentleman, at a total cost of $122,211.

The population of Bradford is put down at 12,000, and 60 gallons per head are allowed them, making the demand on the works, 720,000 gallons per day.

NEW ORLEANS—The ordinance passed in 1881, granting privilege to the New Orleans Sewerage and Drainage Company, which we last week noticed as likely to be repealed by the city council, has now met that fate. The delay in beginning the work is the reason given for the repeal.

CHICAGO.—Legars & Skerry have received the contract to build the jail at Brighton for $15,000. Ruet & Coolridge are awarded the contract for the bridge over Calumet River at, 92d street, for $26,000.

LA PASSE, CAN.—Tenders for foundation and masonry for a bridge over the Ottawa River will be received by C. N. Armstrong, until Feb. 8.

NASHUA, N. H.—Committee on Highways invite proposals for iron bridge across the Nashua River. Span about 152 feet, roadway 22 feet, with sidewalk on each side.

BROOKLYN, N. Y.—The lowest bid (received by J. V. Meserole, Surveyor and Engineer, on the 13th inst.) for grading and grading Knickerbocker ave., 70 feet wide, 34 feet between curbs, from Myrtle to Flushing, about 3,500 feet was $5.25 per running foot, by Jas. H. Gillen, 314 Franklin avenue.

BROOKLYN, N. Y.—Chief Engineer Van Buren, of the Department of City Works, is having plans prepared for a new turning bridge over Newtown Creek. It will be of iron, 165 feet long and 33 feet wide, with central pier, and steel cables. The sum of $60,000 has been raised in tax levy for the bridge.

TOPEKA, KANSAS.—The following if a synopsis of bids received for sheet copper for the court house and post office.

BIDDERS.	RATE PER POUND. 24" AND 48" SHEETS, TINNED ON BOTH SIDES.		
	12 oz.	14 oz.	16 oz.
Park, Scott & Co.	$32.50	$30.00	$28.00
J. R. Michael	35.57	33.77	31.97
Hayward & Hutchinson	37.70	34.45	31.00
John Farquhar's Sons	37.50	36.50	35.50
E. F. Wagner	38.67	35.71	33.00
Bourden Copper and Brass Works	39.75	36.75	34 00
Shoemaker, Voute & Birch	40.67	37.71	35.00
C. G. Hussey & Co	40.67	37.71	35.00
Merchant & Co	40.67	37.71	35.00
Ansonia Brass & Copper Co	40.67	37.71	35.00

The bid of Park, Scott & Co., the lowest, has been accepted.

NEW YORK CITY.—Six bids for flagging sidewalks and setting curbstones on streets surrounding Fulton market, were opened by the Commissioner of Public Works on the 16th inst. The lowest was $4,790, by Morton J. McInerny.

Portland, Me., was indicted in 1881 for allowing sewer deposits to accumulate in a dock, and creating a nuisance. The city filed a demurrer, contending that a municipal corporation could not be indicted for a nuisance of that nature. The opinion of the full bench of the Superior Court, just received, sustains the indictment.

The contract for a new station house in the 22d ward of Philadelphia was awarded the 17th inst., to Joseph N. Patterson for $33,350.

The engineer of the Cincinnati Board of Public Works estimates that it would cost $717,128.20 to put the streets of that city in good repair, in 1883, and $320,000 per year to keep them so thereafter.

Mr. W. Paul Gerhard, lately with Col. George E. Waring, has resigned his position of Chief Assistant Engineer of the Drainage Construction Company of Boston, to become Chief Engineer of the Durham House Drainage Company, of this city.

In Montreal, the *Star* complains that the sidewalks are in a disgraceful condition, "thanks to the city by-law, which makes it the duty of the property holders individually to keep them in order." This seems a poor excuse. Why don't the authorities compel the individuals to do their duty? They manage this thing better in the little city of Yonkers, which bounds New York City on the north. The street commissioner there makes the property owners do their duty, and last summer nearly all the sidewalks were relaid, where the growth of trees and natural settlement had made the flag stones irregular. Indeed, as far as police and streets are concerned, many more ambitious cities could profitably take lessons from Yonkers.

The Mayor of Philadelphia has signed an ordinance making it compulsory that the Chief Engineer of the Water Works of this city shall be both a civil and mechanical engineer.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

14th st. s s 180 e 13th av, br fac; cost $14,000; o, Electric Candle Co.; b, O. E. Perrine & J. G. McMurray....Av A, Nos. 169 and 171, two br ten; cost, ea, $14,000; o, Louis P. Rollwagen; a, W. Jose.... Franklin st, Nos. 9 and 11, br warehouse; cost, $45,000; o, Morris S. Herrman; a, Geo. W. Da Cunha....23d st, s s, abt 180 w 7th av, br, b s trimmings, flat for forty private families, br, and News' patent roof; cost, $300,000; o, George M. Smith, et al; a, Hubert, Pirsson & Co....24th st, No. 331 e; br ten; cost, $18,000; o, Watkins Bros.... 51st st, s s, from Broadway to 7th av; br stable; cost, abt $35,000; o, C. Alfred Skrine; a, H. J. Dudley....40th st, No. 237 West, br ten; cost $16,000; o, L. and K. Ungrich; a, M. L. Ungrich; b, not selected.... 88th st, n s, 235 6 e 4th av, two br ten; cost, ea, $15,000; o, Mrs. Honora Byrne; a, J. McIntyre; b, —— Byrne....108th st, n s, 150 w 2d av, twelve b s ten; cost, $——; o, Jacob L. Maschke; a, J. C. Burne; b, not selected....2d av, s w cor 106th st, four Connecticut b s st, and ten; cost, ea, $12,500; o, Ellen Murray; a, Andrew Spence... 106th st, s s, 73 w 2d av, one Connecticut b s ten; cost, $13,500; o, and a, same as last... 59th st, n s, 30 e 9th av, br st and ten; cost, $18,000; o, Mary J. Odell; a, John Sexton; b, E. H. Miller....104th st, n s, 250 e 9th av, Connecticut b s dwell. and two-story extension; cost, $18,500; o, Charles D, Thompson; a, G. M. Huss; b, J. Coar....St. Nicholas av, n w cor 154th st, eleven br dwell; cost, ea, $9,000; o, John Kelly; a, James Stroud....8th av, s e cor 143d st, three br ten and st; cost, two, ea, $10,000, one, $8,000; o and b, Patrick Whelan; a, Geo. S. Ferris....143d st, n s, 425 e Willis av, eight frame dwell; cost, ea $2,200; o, Chas. Van Riper; a, H. S. Baker.

ALTERATIONS, NEW YORK CITY.

Fulton, Water and Pearl sts, United States Hotel, interior and exterior alterations; cost, $10,000; o, Daniel C. Bloodgett; a, James M. Magregor; b, Wm. Haw....Market st, No. 52, add one-half story br extension; cost, $4,000; o, Henry Schmutsh; a, Chas. Schmeiser.... Market st, No. 54, raised one-half story; o, Mrs. Amelia Horn; a, C. Schmeiser....52d st, n s, 100 e 5th av, one-story extensron; cost, unknown; o, Carrie Shannon and Chas. R. Purdy; a, R. Mook; b, J. H. Rogers....5th av, No. 536. iron columns inserted and front alterations; cost, ——; o, Messrs. Everall Bros; a, T. Stent; b, not selected.... Broadway to 7th av, and s s 43d st, raised from four to six stories, alteration for apartments; cost, $——; o, Amos F. Eno; a, R. Mook.. Madison av, No. 341, to be raised one story and alterations to store front; cost, $5,000; o, Chas. A. Dards, on premises; a, J. E. Terhune.

BROOKLYN.

Stagg st, Nos. 262 and 274, ss, 175 and 325 w Waterbury st, two frame dwells; cost, $5,000; o, Chas. R. Baker; a, Th. Englehardt; b, J. Rauth and C. Wieber....17th st, s s, 20 e 5th av, five dwells; total cost, $12,000; o, Chas. Long; b, J. F. Wood.

BUFFALO, N. Y.—Circle st, res'd; cost $7,000; o, Mr. Lunson; a, E. L. Holmes....Delaware av cor Utica; res'd; cost $40,000; o, Harry Hamlin; a, J. L. Silber; b. C. S. Chapin....North st, res'd; cost $25,000; o, R. K. Noye; a, J. L. Silsbee....Circle st, res'd; cost $11,000; o, J. S. Bennet; a, F. W. Caulkers & Co.... North st; res'd; cost $12,000; o, G. P. Sawyer; a, J. L. Silsbee ....Michigan nr Eagle sts, res'd; cost $10,000; o, Dr. Dambach; a, M. E. Beebe....Seneca nr Michigan sts; store; cost $14,000; o, E. G. Stendt; a, H. H. Little.

BOSTON, MASS.—Marginal st, 1 br engine h; o, Boston & Albany R. R. Co....Old Harbor Point; 1 br pumping station; o, City of Boston....32 George st r, 2 br dry houses and man'f'y; o, Thos. G. Scanlon; b, Edward Lynch....163 and 165 Kneeland st, 2 br dwel; o, R. J. Monks....155 and 157 Kneeland st, 2 br dwel; o, R. J. Monks ...Unnamed st nr Fremont st, 5 br dwel in block; o, Byron A. Atkinson; b, Freeman Hopkins....Centre st nr Dorchester av; 1 fr dwel; o, Ira A. Medbury; b, Ira A. Medbury .....East 4th st, 2 fr dwel in block; o, James. E. Rowe; b, Henry Reyes....Harvard st, 2 fr dwel in block; o, Charles Newhall; b, Chas. E. Currier....Walnut av, 2 fr dwel; o, Wm. Donaldson; b, Wm. Donaldson....Ray st, 2 fr dwel in block; o, John B. Mulvey; b, John B. Mulvey....Sheridan av, 1 br dwel; o, Mrs. Victoria Sammett; a, Joseph Simpson....G st cor e 9th; 1 fr storage of boats; o, M. Sheedes; b, Henry Boodea ...5 and 6 Regent square; 2 fr dwel in block; o, Geo. L. Theyer....River View st; 2 fr dwel; o, Nathan Hunt; b, F. M. Sereance....Maxwell st, 1 fr dwel; o, B. Graziana; b, B. Graziana....341 Pine st, 1 fr storage, o, Coleman O'Melia; b, Jas. H. Coffin....Hanton st, 1 fr dwel; o, Joseph H. Whitney; b, Joseph H. Whitney.

CLINTON, IOWA.—Nothing over $5,000 reported.

CINCINNATI, O.—Fourth nr Walnut st. 8 stone fronts; cost $40,000; o, T. J. & J. J. Emery; b, T. J. & J. J. Emery.

CHICAGO ILL.—Port Richmond st, boat house; cost $7,000; o, J. J. Eberhardt; a, Jul. H. Huber... Staten Island st, fr, with appointments of a club house....n e cor 32d st and Groveland av, 4 limestone dwel; cost $26,000; o, U. P. Smith; a, Wheelock & Clay: b, F. C. Heath....n e cor 33d st and Cottage Grove av, rock faced artesian well, st residence; cost $10,000; o, U. P. Smith; a, Wheelock & Clay; b, Geo. McDonald.....Cottage Grove av, s of 33d st, br bl of stores and flats, cost $30,000; o, U. P. Smith; a, Wheelock & Clay; b, Wm. Zuelsdorf....Irving pl nr Adams, 2 br flats, cost $9,000; o, Arnold Bros.; a, J. C. Zarbel; Jeos Olesen....155 S Sangamon st, br dwel, cost $5,500; o, P. J. Ryan; a, J. Zucker; b, J. W. Casseid Co....Cor Winchester av, and Van Buren; br flats; cost $10,000; o, Wm. Mara; a, J. C. Zarbel; b, Jens Olsen.

ST. LOUIS.—School st bet Compton & Cardinal av, br dwel; cost $6,000; o, P. H. Tobin; c, G. E. Willer....Hickory bet Dillon and Gratton sts, br dwel; cost $6,500; o; Jas. A. Quirk; c, Thos. Gugerty....Hickory sts bet Dillon and Gratton avs, br dwel; cost $8,500; o, Jas. A. Quirk; c, Thos. Gugerty.

WORCESTER, MASS.—Foster st, 68x102, br mill, cost $12,000; o, C Baker & Co.; a, A. P. Cutting; b, J. A. Prince....Foster st, 20x180 br mill; cost $6,000; o, W. T. Merrifield; a, none; b, J. A. Lovel. ....Lancaster st, fr dwel; cost $7,000; o, C. A. Higgins; a, Barker & Nourse; b, Hubbard Bros....Prescott st, 6 ten dwel; cost $5,000; o, John Sharkey; a, none; b, Geo. C. Reily... Catherine st, fr dwel; cost $5,000; o, C. E. Sanford; a, S. C. Earle; b, H. W. Eddy.

MISCELLANEOUS.

OXFORD, MASS—Fr dwel; cost $8,000; o. J. B. Burnham; a, A. P. Cutting; b, Chas. Fuller.

LEOMINSTER, MASS.—Fr dwel & Stable; cost $10,000; o, F. W. Whitney; a, Barker & Nourse; b, A. E. Lyon.

KANSAS CITY.—The cold weather has stopped building operations for the present.

NEW YORK.—A plan will be reported on by Commissioner Van Cott, for building a fire-proof building for the fire department for fire telegraph apparatus.

OGDENSBURG, MALONE, N. Y., br Court House, cost, $30,000; o, Franklin Co., N. Y.; a, C. Cummings, Troy, N. Y.; b, not let.

PHILADELPHIA, PA.—N cor 3d and Huntingdon; repairing 3d st Dining House; 4th st addition; b, John Dawson....Bedford & Mervine, 1 story beer house; a, Chas. Wolter.

VILLAGE ALBION, N. Y.—Opera House, cost, $22,000; o, John Pratt; a, H. B. Gleason; b, day work.

NUNDA VILLAGE, N. Y.—Br block 5 stores, cost, $14,000; o, C. K. Sanders; day work.

DANT VILLAGE, N. Y.—br house, cost, $100,00, dr.; a, A. J. Warner; b, A. Frederick.

WARDS PARK CITY.—br block, 12 houses, cost, $45,000; a, C. Ellis; b, Chas. Pratt....East Ave., city, br res, cost, $30,000; a, A. B. Lamberton; b, not let....Merrimac st., 6 fr dwel; cost, $3,000 each; Paul Schlicht; a, H. B. Gleason; b, day work.

PERRY VILLAGE, N. Y.—br residence, cost, $5,000; o, James Wyckoff; a, H. B. Gleason; b, not let.

ROCHESTER, N. Y.—Arnold Park City, st res; cost, $5,000; o, Nettie M. Fairchild; a, H. B. Gleason; b, Chas. Pratt.

EXCHANGE ST., CITY.—br fac, cost, $20,000; o, John A. Smith; a, H. B. Gleason; b, not let....State st, city, br block, cost $30,000; o, Louis Walbridge; a, A. J. Warner; b, G. Wagner....N. st. Paul st, city, br fac, cost, $80,000; o, H. H. Warner; as, Thomas & Rodgers; b, not let....Main st, Hotel, cost, $300,000; o, D. W. Powers; a, A. J. Warner; b, H. Gossline.

SIOUX CITY, IOWA.—Eighth cor. Jones and Seventh, 22 and 24, br dwel; cost, $8,000; o, T. J. Stone; a, G. G. Baldwin....Pearl st bet Third and Fourth, b str, cost, $7,000; o, E. Courtwright; bs, Killian & Poor.

UTICA, N. Y.—N. W. cor. Catharine, Ale Brewery, cost, $10,000; Utica Brew Co.; a, Thos. Birt; b, Jos. Butcher.

WASHINGTON, D. C.—The Board of Regents of the Smithsonian Institution have recommended to Congress the building of a $300,000 fire proof building for the museum.

The Falconwood Club House, at Grand Island, N. Y., will cost $25,000 and work on foundation is now progressing. It will have spacious entrance hall, reception, billiard smoking and toilet rooms, wide oaken staircase; the dining hall will seat 100; kitchens in a large cottage in the rear.

WASHINGTON, D. C.—No permits issued for any building over $1,500 during the past week.

HACKENSACK, N. J.—State op Salem, Guild House; cost $5,000; o, Christ Church Guild; a, J. Hudson Holley; b, J. Vail. Contracts for heating, lighting and plumbing not yet let, will probably bring the cost up to $7,000.

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EMPLOYMENT WANTED. P. 185.
PROPOSALS. P. 185.
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GAS and Steam and Plumbing Supplies —A man well acquainted with the trade wants a position as traveller. Address, G——.

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Proposals.

Laying foundation for County Court House, Duane Co., Florida. Until Feb. 1. Address T. E. BUCKMAN, *County Clerk*, Jacksonville, Fla.

Building Lock No. 2, of Great Kanawha River. Until January 31, Address, E. H. RUFFNER, *Capt. of Engrs.*, U. S. Engineer Office. Charleston, W. Va.

Constructing dike in New Haven Harbor. Until Jan. 23. Address J. W. BARLOW. *Major.* J. W. BARLOW, U. S. Engineer Office, New London, Conn.

Removing rock and cobblestone from channel of lower Clearwater river, Idaho. Until Jan 21. Address CHAS. F. POWELL, *Capt. Engrs*, U. S. Engineer Office, Portland, Or.

Labor and materials for livery building at Brookfeld, Mass. Until January 31. Address WAIT & CUTTER, 7 Exchange Place, Boston, Mass.

Furnishing hardware for Custom House and Post Office at St. Louis. Until February 3. Address JAMES G. HILL, *Supervising Architect*, Treasury Department, Washington, D. C.

Constructing Water Works at Durango, Col. Until February 1. Address F. W. BARNES, *Clerk of Board of Trustees*, Durango, Col.

Building Lock No. 2 of Great Kanauba River. Until January 31, Address E. H. PUFFNER, *Capt. Engrs.*, U. S. Engineer Office, Charleston, W. Va.

Post Office fittings at Bellville Ont. Until February 6. Address F. H. ENNIS, Department of Public Works, Ottawa.

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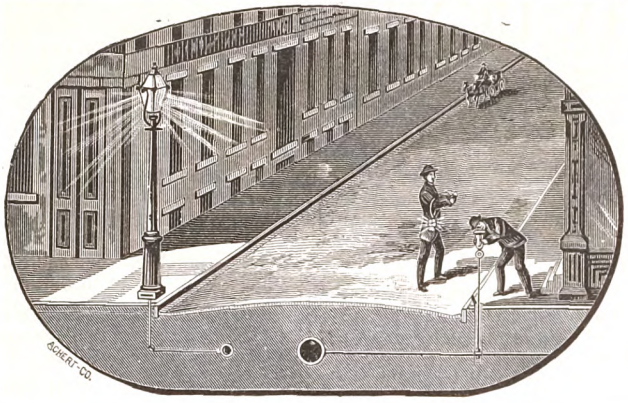

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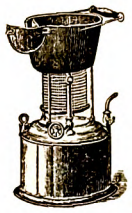

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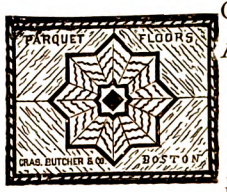

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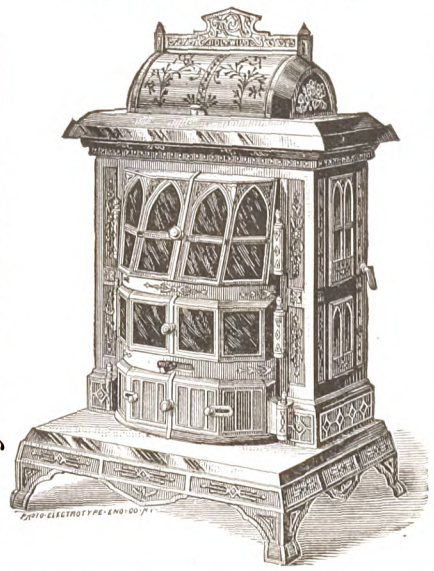

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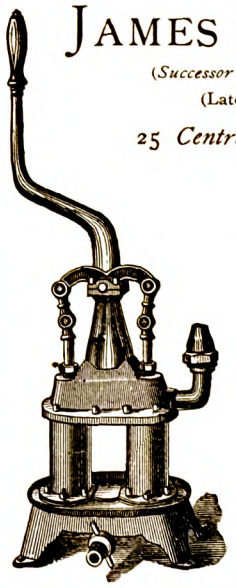

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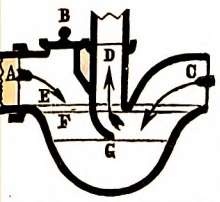

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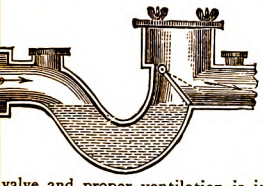

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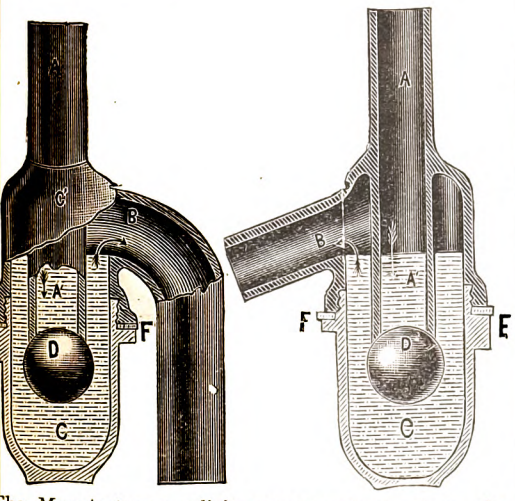

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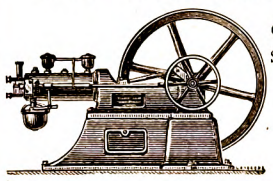

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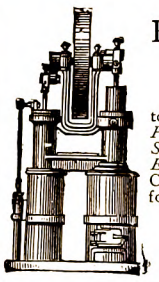

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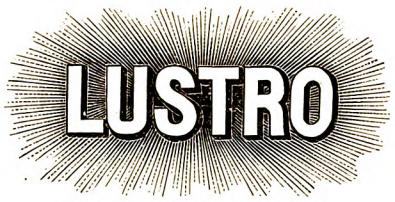

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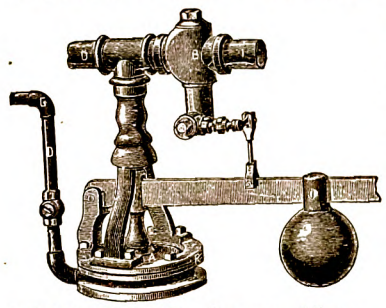

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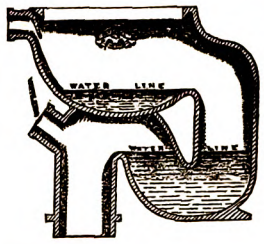

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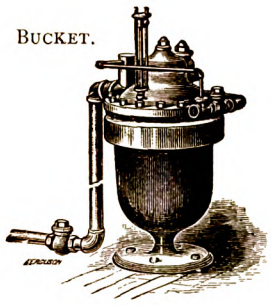

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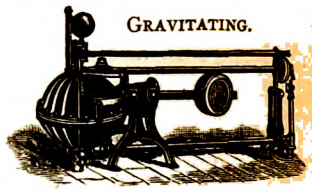

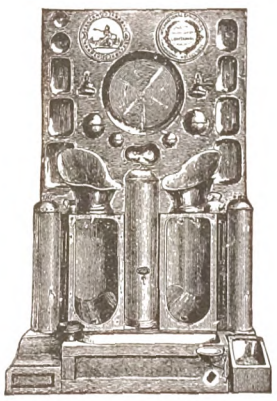

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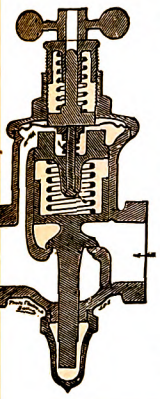

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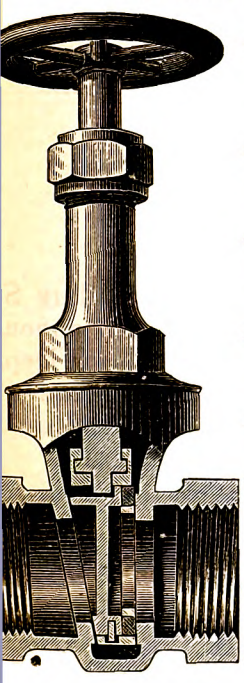

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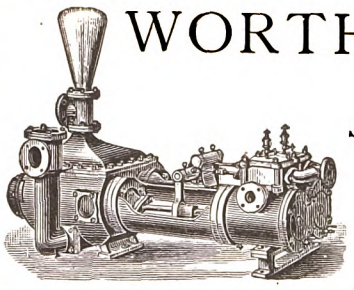

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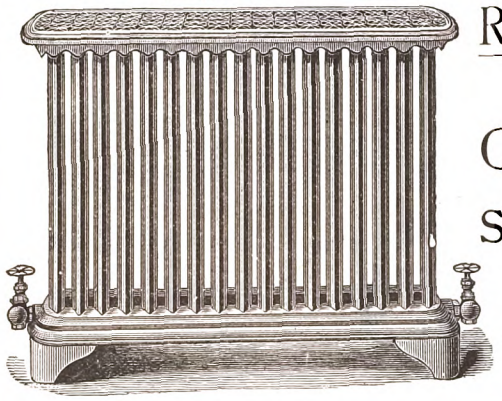

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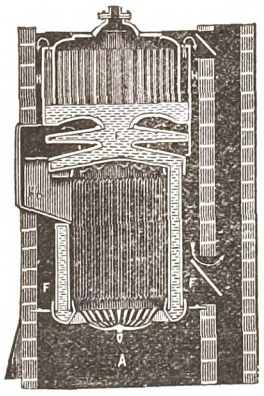

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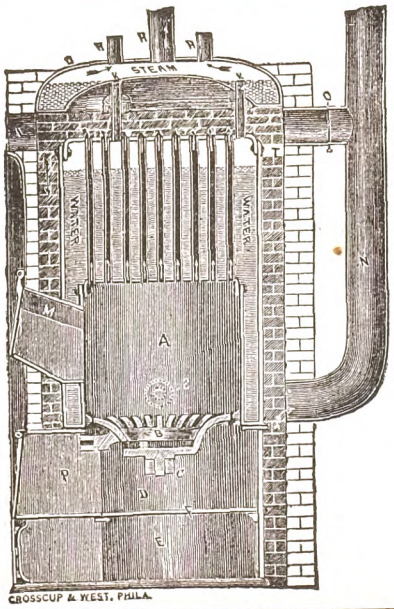

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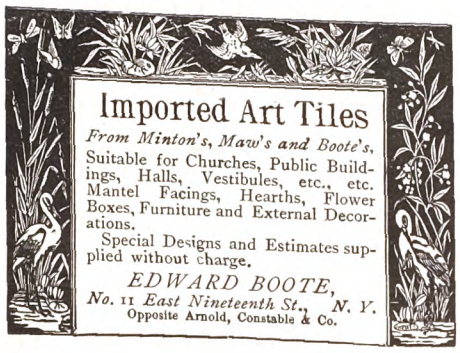

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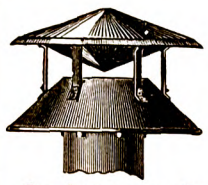

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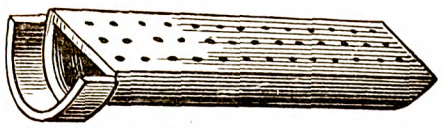

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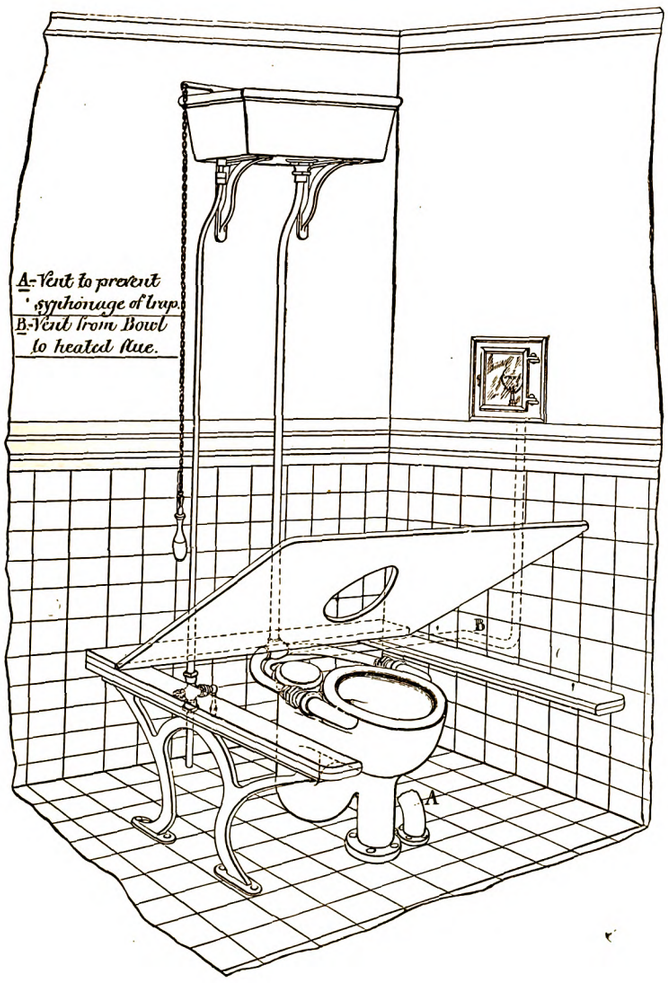

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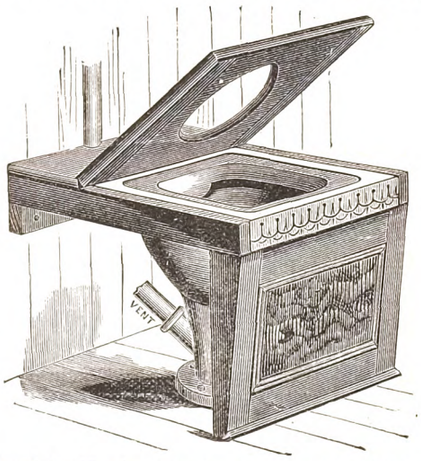

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NOTICE.—Correspondents will prevent needless delays and annoyance if they will address all communications, except those of a strictly private nature, to THE SANITARY ENGINEER. Checks should also be drawn to the same order.

SMALL-POX.

From East, West, North and South come reports of fresh outbreaks, or of the spread of small-pox. Our exchanges are filled with the deliberations of health officials upon the subject, and, while in many quarters an effort is made to hush the matter up, for the sake of business interests, the result usually is to increase the distrust, if not at once, at all events, for the future. What reliance, for example, can hereafter be placed on the statement of the health authorities of Chicago as to the prevalence of small-pox in that city, when we know that they have, during the last year, made false returns on this subject. And yet they seem rather inclined to boast of having done this than to be ashamed of it. Dr. Rauch, the Secretary of the State Board of Health, is reported by the Chicago *Tribune*, of the 20th ult., as saying, that it is sometimes necessary to withhold such information, and, as commending the health authorities for the course pursued. We say nothing about the morality of this sort of teaching, but we are quite sure that honesty is the best policy in the long run.

The small-pox items in the daily press contain a great deal about quarantining the disease. They have been trying this in Baltimore, and in Nashville, and now we see that the New York State Board of Health is reported as having advised that a certain number of towns in Schuyler County should be quarantined on account of small-pox. All this quarantining and placing guards over infected houses, etc., has always proved a failure when relied on as the sole means of stopping the spread of small-pox. Baltimore and Nashville have found it so, and are now proceeding to do what they ought to have done a year ago—namely, to enforce systematic vaccination of the community.

How absurd and childish a small-pox panic is. Every one has it in his power to make himself and his family almost absolutely secure from danger from this disease, by securing proper vaccination. When he has done this, he has no occasion to run away from a small-pox patient.

Take the following item from the Chicago *Tribune*, of Jan. 21, as a specimen:

(Special.) RAT PORTAGE, MANITOBA, *Jan.* 20.

Twenty lumbermen, suffering from small-pox, are expected here every moment in a car. The town is in terrible excitement. All business places are closed. None but employés are allowed within admission distance of the hotels. Mayor Oliver is swearing in special constables to protect the town. The intention is to send the sufferers on to Camp No. 2, two miles west of here, where clothes, bedding, and provisions have been placed for their use. There is only one case at present in town, which is being attended to.

The swearing in of the special constables is very good. What a fine scene in a comic opera could be made out of this.

But, while small-pox panics have their comic aspect, there is also a very dark side to the picture. This, to our mind, is not so much the death and loss caused by the disease, as it is the fact that, in this year of our Lord, 1883, in what we think is a civilized and enlightened country, there are people going about trying to persuade others not to be vaccinated and not to allow it to be done in their families, and that among the ignorant poor they succeed to a considerable extent. We are reaping the result of the seed sown among the peasantry by the anti-vaccination fanatics abroad, and, upon their heads, rests, to a large extent, the heavy mortality among our immigrant population.

What should be done with men and women who preach such fatal doctrine? It strikes us that a good insane asylum, organized on the principle that the occupants shall be made to work enough to pay all the expenses of the institution, would benefit both them and the community at large.

NEW YORK'S WATER SUPPLY.

No. II.

THE SUPPRESSION OF WASTE.

As an illustration of what may be accomplished under proper regulation to suppress water waste, we quote from an address of Mr. Thos. Hawksley, Past President of the Institution of Civil Engineers, delivered at Liverpool, in 1876:

"The necessity for the adoption of an uniform and uniformly applied system of rules and regulations, is manifested by the results of their application or otherwise in towns of a generally similar character. Oxford and Cambridge are two such towns; in the former, where no efficient regulations are in use, the quantity delivered is eighty gallons per head; in the latter, where efficient regulations are in use, the quantity delivered is eighteen gallons."

Thirty years ago, the water supply of nearly every English city was on the intermittent plan, it being supposed that under a constant service the waste would be so great that the water companies would be unable to keep up the supply. In cities therefore where a scarcity of water was imminent and with very little prospect of an early increase, attention was turned, as it never is in times of plenty, to the adoption of measures for the suppression of waste.

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The means adopted in Great Britain to check waste are substantially three:

First. Intermittent supply and an inefficient inspection and supervision over fittings and plumbing work.

Second.—Testing and stamping of all fittings, rigid rules to govern the plumbing work, inspection before water is turned on, and house-to-house inspection periodically thereafter.

Third.—The Liverpool plan, which is to have district meters in the streets in order to localize the waste, rigid and persistent inspection, careful testing and stamping of every fitting used, and inspection of the plumbing work periodically thereafter.

Norwich was the first city in England to secure parliamentary powers to adopt and enforce rules controling the character of the water fittings and the plumbing. This was made necessary, as the consumption had so increased, that the intermittent supply had to be reverted to. The consumption had then risen to what in England is regarded the enormous amount of forty imperial gallons per head, daily, about forty-eight United States gallons. Under the direction of the eminent hydraulic engineer, Mr. Thos. Hawksley, parliamentary powers were sought and obtained, rules were prepared and enforced, defective mains replaced, and waste stopped to such an extent, that the consumption was brought to fifteen gallons per head, less than one-third the former amount, and the constant service was restored and has ever since been maintained.

Many other cities sought and secured the power to regulate the use of water supply fittings and control the manner of doing the plumbing work, and the essential features of the Norwich Water Works Rules are embodied in every set of water works regulations in Great Britain, while as a matter of fact hardly a single one of them obtains in any American city.

It must not be supposed that the powers to regulate these matters were easily obtained; on the contrary, they were fought inch by inch and were only secured by most persistent effort and the expenditure of large sums of money by the various companies. As an instance, we would cite the case of the adoption of the rules to govern fittings and methods of plumbing in Sheffield. The hearing before the magistrates, who by the act of Parliament were required to sanction them, continued thirteen days and cost the water company twenty thousand dollars.

In London the water is supplied entirely by private companies, and with the exception of one or two, the supply is yet intermittent. Being private corporations, they have not been able to secure such control over the fittings and the plumbing work as some of the other cities possess, due probably to the fact that powers of the kind sought are not readily granted to any but municipal authorities. The rules under which they now act were adopted about 1873, and required the sanction of the Board of Trade, who appointed as commissioners to confer with the water works' managers, the Duke of Richmond, Capt. Tyler and Mr. Robt. Rawlinson.

The original demands of the water companies were considered excessive and were strongly resisted. They were modified by the Board of Trade, and finally agreed to. Being private corporations the feeling against the water companies is much like that against gas companies. The managers, therefore, in order to prevent controversies, and relying on their intermittent service to restrict consumption, are more lax in the enforcement of their published rules, than are the authorities of Liverpool, Manchester and Glasgow. The result is, that many so-called waste-preventing devices are used in London, and winked at, that are not permitted in the other places, the effect of which, however, is to afford a market for the inventors of new things.

[To be Continued.]

With a clear perception of what stroke of enterprise would be of greatest practical benefit to its readers, the *American Architect* some time ago proposed a competition for artistic houses of so moderate cost as to be within the means of clerks and others on small salaries, or in rather narrow circumstances. By the terms of the competition the cost is not to exceed $3,000. The competition closed Jan. 13, and the editor of the *Architect* now announces that it has been successful beyond his expectations, and that a large number of plans of value have been offered them which will be published in the *Architect*. The first appears in the issue of Jan. 20. The award of prizes will be soon announced.

How slow the reform of the sanitary condition of the homes of a large city must be was indicated last week by the experience of a civil engineer, while looking for lodgings in the apartment houses of this city. He visited twelve in all, and naturally observed the plumbing pretty closely. They had all been built within two years, yet in only one were the traps ventilated against syphonage, and in only two, were the closets flushed from special cisterns. Yet, small as the improvement seems, in proportion to the vast size of the city, already it has gone far enough to give safer habitations to very considerable numbers of people. In Brooklyn, it has recently been stated, that more than 5,000 persons have been provided with sanitarily safe homes by the six months of enforcement of the plumbing law, and in this city the number is unquestionably much greater.

Gov. Butler, of Massachusetts has appointed a lawyer from Reading to succeed Dr. Chas. F. Folsom as one of the trustees of the Danvers Insane Asylum. Dr. Folsom, at personal inconvenience, gave much time to the interests of this institution. His special knowledge and experience made his services of the greatest value. Dr. Folsom will be a gainer in being relieved from his unpaid duties; the State, however will be a loser. Gov. Butler has started badly in this line.

Many people believe that kitchen slops are entirely harmless, at any rate that when poured in the cess-pool or on the ground no harm, no smells can result; but now and then they find to their dismay, that kitchen refuse, when decaying, is no less offensive than water closet wastes. Last summer a gentleman who had had such an experience, with no fault of his, however, explained how he had fared. It seemed that a drain which took only his kitchen slops emptied into a pond. The ice in the pond broke and stopped up the drain, the kitchen slops escaped from it into the ground under the house, and such a nuisance resulted as demanded rigorous action. He was obliged to dig out the polluted soil and refill with clean, dry earth. No use of disinfectants would reach the difficulty.

What the lack of proper sanitary precautions may sometimes cost a town, is shown by the experience of Bangor, Eng., where a severe epidemic of typhoid fever prevailed last summer. To meet the additional expenses thus incurred has required twenty thousand dollars, and the imposition of a half-year's rate of 3*s.* in the pound, quadruple what has been required for many years.

The utility and necessity of distinguishing in some way between the plumbers who are a credit to their trade, by honesty and capacity, and those who dishonor it by ignorance and dishonesty, is agitating the plumbers of Philadelphia, as they are now taking the first steps towards plumbers' registration. Some, we believe, look to city and State Legislatures for action which will discriminate between who may enter the trade and who may not. But the practicability of this as yet is doubtful, and in the contemplated organization of a master plumbers' association a better opportunity is offered to gain the desired object. Let this association, when it is organized, define who may be its members and who shall be excluded, and membership will become an honor and the failure to obtain it a stigma which will do much to purify the trade there of undesirable persons.

To bring medical aid quickly, in cases of sudden sickness or accident in the night, a Night Medical Service has just been organized in Brooklyn by the Health Commissioner. The police precincts are made for this purpose registry districts for such physicians as are willing to undertake the night service. On applying to the captain of the precinct the physician's name and address are entered on a list which is hung up conspicuously in the station. Then, any citizen who may need medical attendance in his family may have an officer of the police force sent for any physician he selects. With such a system extended over the entire city, the relief might afford can scarcely be over estimated.

The Asbury Park, N. J., Board of Health seems to be vigorously and successfully engaged in attacking the nuisances which such a place is particularly exposed to. To diminish as far as they can the cesspool nuisance by preventing the pouring of the kitchen slops into the ground, they have ordained that the hogheads, barrels or boxes, which are sunk into the earth for slop-receivers, shall be taken out, the openings made by their removal filled with clean, dry earth, and that the refuse which formerly went into them shall be placed in water-tight receptacles, and carted immediately away.

In a remarkable indictment the Grand Jury of Pensacola, Fla., have presented the Board of Health of that city as guilty of gross negligence in not taking proper precautions to prevent the introduction of yellow fever into Pensacola in 1882, in employing an incompetent physician at the quarantine station, in failing to take proper measures to stamp the yellow fever out after it appeared, and in suppressing information and misleading the people of Pensacola, and of other cities and neighboring States, and "for these causes," the indictment proceeds, "we consider them responsible for the loss of many valuable lives, and for incalculable injury to the business interests of the city."

Probably no more terrible arraignment has ever been made of any American sanitary authority. Yet the temperate references of the press indicate that it is just, and results from a very deep popular resentment about the shortcomings of the board.

The movement of the Hartford Steam Company to obtain such change of charter as will permit them to supply gas of cheap quality for heating is regarded with suspicion by both the gas company and the street commissioners. By the former, because they believe this the first step towards furnishing illuminating gas, by the latter, because they fear an aggravated breaking up of the streets to lay the necessary pipes. At the instance of the street commissioners the Aldermen have ordered the city attorney to apply to the State Legislature for such a change of the law as will prevent the granting of a hearing on any petition for the incorporation of a gas or steam company asking for privileges in the streets of Hartford, unless some general notice as prescribed by the Legislature is given of the proposed hearing.

To meet the great danger connected with elevator shafts of inflammable material, one of the many bills which have been introduced into the Wisconsin State Legislature to secure the safety of guests at hotels, provides that the shafts shall be of fire-proof material. For houses accommodating one hundred persons there must be at least two outside fire-proof staircases. The partiwalls must be fire-proof, and each sleeping apartment connected with the office by electric alarms. This bill also makes it compulsory to keep watchmen on duty from midnight until five o'clock in the morning. This, and other measures of similar purpose, will probably be referred to a legislative committee for report.

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GENERAL STEAM SUPPLY FOR NEW YORK CITY.

HE WORK OF THE NEW YORK STEAM COMPANY.

(Continued from Page 171.)

From the area wall the system consists essentially of wo pipes, a larger one for conveying the steam to the con- nmer and a smaller one for returning the condensed vater to the station. The subdivisions of the sys- em which radiate from the station ramify in many direc- ons, pipes now being laid in Broadway from Warren reet to Bowling Green; from Broadway down Wall street Pearl; also down Pine and Fulton to Nassau, and Lib- rty street and Maiden Lane to William street; also a line the neighborhood of Ann and Beekman street. On the ther side of Broadway pipes are laid through portions of reenwich, and in Liberty, Courtland, Fulton, Vesey, arclay, Park Place and Warren streets, from Broadway Greenwich street.

These pipes are laid in a brick conduit, where they are of rge diameter, and the spaces filled with "mineral wool," e., blast furnace slag blown to a fine floss by the action steam while hot; some of the small pipes are covered a wooden log bored to receive them and prepared prevent rotting.

The pipes are placed at nearly uniform distance below e surface and little attention given to inclination or tch, simply following the grade of the ground, though voiding a sudden dip when possible.

Bends of small magnitude, sufficient to follow the con- ur of the ground or slight deflections from a right-angle street corners, made necessary by the irregular shaped ossings, are provided for by what may be called a "ball d socket" joint. It is somewhat like a flange-union, ving a convex extension on one face, with a correspond- g concave on the other, the faces being segments of a e circle, and when put together with one of the copper skets before mentioned will make a steam-tight joint.

The water of condensation which forms within the eam pipes when everything is in full operation, is said be comparatively small, but small as it may be, it is cessary to prevent its accumulation and not carry it long stances by forcing it ahead of the steam. At distances about 75 feet, or to every six house-lots, three on each le of the street, there is a special contrivance shown in gures 8 and 9, which is variously called, "Expansion int," "Service Box," "Junction" and "Compensator," and ich in fact, does more than its name implies. Its prime ject is a compensator for the expansion and contraction the iron pipes, and it also makes a suitable fitting from ich to take the house services, but in addition it is the ans of freeing the mains from water. The pipes *a a* the main flow pipes. The joint itself (*B*) is anchored d firmly fastened, and the pipes which approach and ve it are also fastened in the middle of their lengths ween it and the joints on each side of it. If now the e is warmed, *c* and *c* being fixed points, the movement d thrust of the pipes *a a*, must be toward *b*, which is o a fixed point, but as the pipes *a a* do not connect ectly with the end of *b*, but pass inside of it and connect h the copper diaphragm (*e e*), the latter yields and bends ward; allowing the whole to adjust itself to the increased gth. The expansion joints are numerous enough to vent any considerable strain on the copper of the dia- agm, the intention being not to strain the metal beyond limit of elasticity, the maximum movement when the joints are placed about 75 ft. asunder being about one inch. The copper diaphragms, which are concentrically corrugated, are reinforced on their outer sides by radial plates which fit closely at their adjoining edges, each forming a sector of a hollow circle, and having a rib or strengthening piece on the opposite side from the pressure. They move with the copper and are supported at their extremities in such a manner as to compensate for and accommodate themselves to the change in length, in fact, they are the real diaphragm of the apparatus, the purpose of the copper being merely to cover the joints between their edges and so render the whole steam tight.*

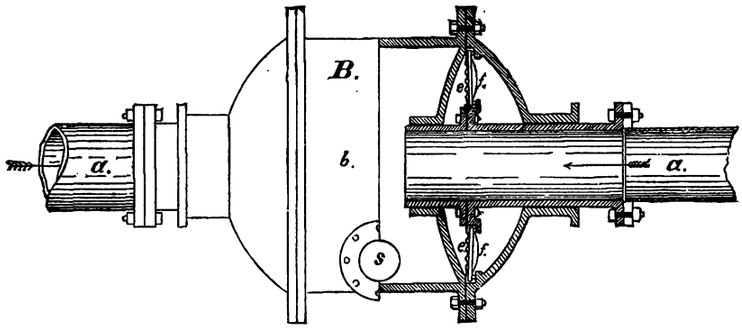

FIGURE 8.

Condensation which forms within the pipes between any two "compensators" falls into the lower side of the annular chamber and is carried into the service-pipe (*S*), if the latter is in use, and if not in use is carried to the first that is in use after filling the intervening ones to the level of the bottom of the flow pipe.

The water which is thus carried out of the main through the first services which are in use, is not carried into an engine, if one is used, nor into the heating apparatus of the house, but returned again into the return water through a steam trap; this we will try to explain with the help of Fig. 10. Within the area-wall is placed a steam trap, a modification of what is known as the "Nåson" principle, because the late Joseph Nason improved it and made a specialty of it, but which we believe was invented by Professor Mapes. This trap takes the water which is carried in through the house-service and falls through the pipe *a*, and discharges it into the return pipe, through the pipe *b*, from the point *c*, then dry steam passes through the pipe *d*, to the house.

Trap No. 2 is to return the water which is condensed within the house, and will drain pipes either above or below the level of the mains in the street.

This principle of trap, we believe, is the only one which can be applied to the system and take the water from the cellar floor or from a sub-cellar. It is thoroughly explained in Baldwin's "Steam Heating for Buildings," page 196, and is called the "pot-trap."

The initial pressure of steam from the street is admitted as far as the "house valve," beyond which is placed the "regulating valve." The object of the latter is to admit of having a reduced pressure within the building. The valve used is the "Curtis Regulating Valve," and can be adjusted to keep a nearly regular reduced pressure—say ten pounds on the house side while there are 50 or 60 in the street, fluctuations in the street not affecting the house pressure.

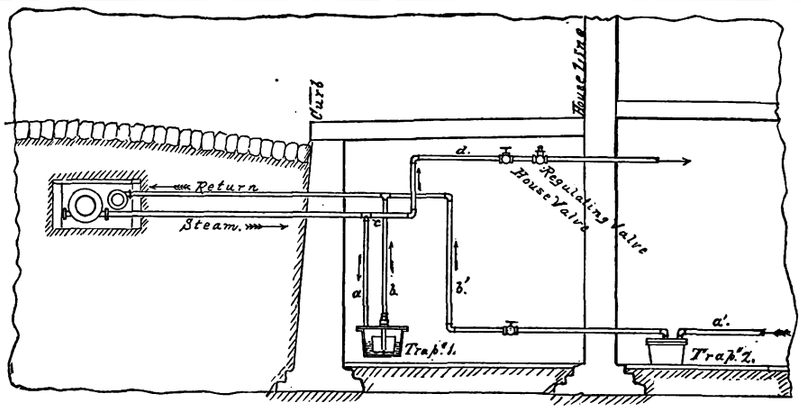

FIGURE 10.

After the water is thrown by the intermittent action of the traps into the main return in the street, it flows back to the station and is received into a large tank, thence to be pumped into the boilers again. The position of the tank is in the ground under the sidewalk, as at T, Fig. 1,* and a large Worthington Duplex Pump (P) sets close to it. This pump is constantly kept running and forcing the water through a system of feed pipes which lead to all the boilers. There is a contrivance which may be called an overflow or relief valve, arranged on the discharge pipe of the pump and loaded to a pressure of about 90 pounds, which allows the water from the pump to return to the tank, or a part of it to so return, should it not be all required at the boilers at any particular time. Each boiler is fed separately and independently, the feed valve being within the control of the fireman.

The fuel for the use of the boilers is elevated to the upper story and fed through chutes to each boiler. The boilers are fired by hand in the ordinary manner.

The ashes are carried away by a system of chutes running from the ash-pit to the basement. These chutes are furnished with a valve within the ash-pit and are within the control of the fireman. They are kept closed except to drop the ashes, otherwise the draft of the chimneys would pull on them, or should the forced draft be on, to prevent the air of the fan from escaping through them.

At the point marked *A*, Fig. 2, at the east end of the southeast battery of four boilers, but on the second floor, is a fan blower with a capacity of 100 M. cubic feet of

*Steam-fitters who are acquainted with the Handren & Robins' regulator, made by the Walworth Manufacturing Co., should readily understand this principle, as it is there used to support the copper diaphgram which operates the valve.

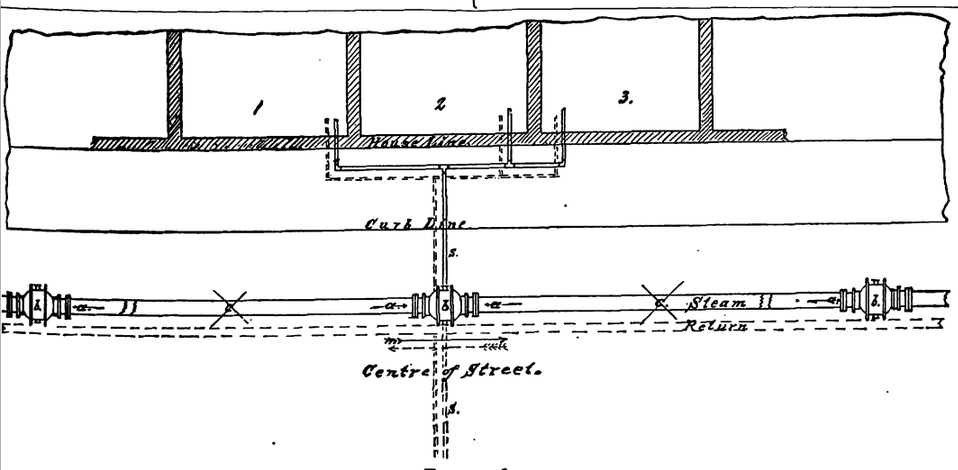

FIGURE 9.

*Figures 1 to 7 inclusive, appeared in the last number, with the first part of this article.

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air in a minute. It is driven by an engine of about 20 horse power, and is to supply air to the fires in case of necessity; it is connected with the ash-pits by a suitable system of sheet iron ducts and takes its air supply directly from the surrounding air of the floor, but should the supply be tardy the window *a* can be opened.

The elevators are situated at *f* and *f*, east end of the building, and are principally for taking up fuel to the fifth floor.

An approximation of the capacity of a station is made by finding the horse power in boilers accredited to the district, a record of which is kept at Police headquarters. The capacity of the distributing mains for a district are also formulated from the same data, allowance being made for probable increase due to the advent of the new system.

The officers of the company are W. C. Andrews, President; Wm. P. Shinn, Vice President; J. A. Bostwick, Treasurer; R. E. Rockwell, Secretary; C. E. Emery Engineer and Superintendent.

COOLING AND VENTILATING THEATRES.

To the Editor of THE SANITARY ENGINEER:

The enclosed letter was handed to me lately as probably containing a problem for the consideration of ventilating engineers, and though the doctor may not be correct, with regard to the ratio of heat caused by compressing air, he raises two questions, to which I would like to get expressions of opinion from some of the correspondents of your paper, namely: 1. Does the air of a summer's night after passing over the ice and escaping into the auditorium have more or less moisture than before it entered the ice-chamber? 2. Which is the cheapest mode—the ice at ordinary prices or the power and water necessary to cool the air, other things being equal? Yours respectfully,

"T."

JAMES BARNES, Esq.

DEAR SIR.—Several evenings ago I had the pleasure of being conducted by yourself over the theatre with which you are connected and was greatly pleased at the mechanical ingenuity shown to attain comfort for the patrons; particularly the arrangement for keeping the house cool. But there is one idea which came up the evening I was there and which was mentioned several times previous to my visit, and has been discussed several times since, in my presence, by various persons, and that is the *dampness necessarily* generated by the air passing over so large amount of ice, as you do now to make it cool. I believe you said *there could not be dampness* unless certain conditions were present, which were not. Permit me to differ with you here and say that the fact of the ice melting is proof *positive* that there is moisture generated and which is taken up by the passing air and necessarily carried into the house. I have thought considerably on this subject, and my object in writing is to submit a plan which is unique and new, so far as being applied to a house as a part of the ventilation, but is not new to science or mechanics.

Every square foot of air has a certain amount of heat. Now if we take two or more cubic feet of air and compress it into one-half its former bulk, it will give up *one-half* of its latent heat; if we compress it again to one-half of its bulk, or one quarter of its former bulk, it gives up three-fourths of its heat, and so on. Compressed to one-eighth its bulk it gives up seven-eighths of its heat. Compression does not generate heat, but causes the same amount of heat to occupy smaller space and thus be made manifest.

Ten cubic feet of air compressed to one cubic foot gives up its heat, and the one cubic foot of compressed air contains no more heat than one foot of outside air. Now, if this one foot of compressed air be let loose it instantly expands and fills a space of ten cubic feet, nearly ten times as cold as the surrounding atmosphere.

It takes up its original amount of heat from the surrounding objects, or whatever it comes in contact with. Ice can and is made easily by this plan. I think it can also be used at your theatre to take the place of the ice which you now use to cool your atmosphere.

A small power could be used to compress air, the heat being taken away by surrounding the compressor tank by water. The air by its own elasticity could be made to pass into the main air flue when it should pass beyond a given pressure, and thus dilute with its own coldness the column of air passing into the house. Should the evening be cool a less pressure could be used, or should it be warm a greater pressure be used, thus having the air less or more cold according to pressure in the condenser.

The idea can, I think, be worked up to the requirements of the case and would, I am sure, be less expensive than ice, and certainly less objectionable as having no dampness.

I hope I have made myself understandable, though fear I may not have done so; but I should like very much to know what your people may think of it.

Respectfully, J. O. T., M.D.

[The plan submitted by J. O. T., M.D., in his letter to James Barnes, Esq., for cooling the air of audience rooms, deserves a few words of comment. The writer is correct in the outlines of the broad principle underlying his plan, although the method of statement of details might cause errors in practically applying his idea. If a cubic foot of air be compressed by a piston or other mechanical means, its temperature will rise. If dry air be taken at 62° F. and compressed to one-half its volume, the final temperature will be 178° F. This is not the rendering recognizable to the thermometer of any heat previously latent in the air. There is no such thing as latent heat in air, in even the same sense as there is latent heat in steam. But the rise of temperature is due to the conversion of the work of compression into units of heat in the compressed air in order that the work of the compressor may be equal to the work of the compressed.

Again, if the final volume be one-fourth of the original volume, the final temperature will be 321° F. These temperatures result from calculations based on the universally accredited formulæ of the mechanical theory of heat verified by every experimenter. Compression, therefore, *does* generate heat in the compressed air according to fixed laws, and the unqualified statement that "ten cubic feet of air compressed to one cubic foot gives up its heat, and the one cubic foot of compressed air contains no more heat than one foot of outside air" must be at once challenged. Ten cubic feet at 62° F. compressed to one cubic foot, will make a thermometer read 569° F. in the compressed volume.

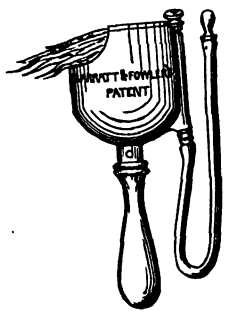
But the writer had said that the "ten cubic feet at 559° *may be made to give up its heat due to compression*, and its temperature can be reduced by refrigeration, or cold water or any such means down to 62° F., so that the one cubic foot of compressed air will contain no more heat than one cubic foot of outside air," his statement would have been unassailable. Then let this foot of compressed air loose to expand into ten feet at atmospheric pressure, and the work done in expansion will lower the temperature of the expanded air, to a temperature of nearly 200° below zero, Fahrenheit. This is not exactly the same statement as to say the air is ten times as cold as the surrounding atmosphere, for while the compression to one-tenth its volume raises the temperature of air at 62° over nine times ($\frac{559}{62} = 9 +$) yet the fraction cannot be simply inverted when the air is to expand from 62° downward. Moreover, as air has no original heat of its own, but changes its temperature only by contact with solids at different temperatures, or by mixture with gases, a difficulty is introduced from this source.

It may be well at this point to look at some of the practical difficulties in the plan suggested. In the first place, compression to one-tenth of the original volume would mean that air at atmospheric pressure would have to be compressed to a gauge pressure of 133 lbs. to the square inch. This would take a very large steam cylinder to accomplish, or else so small a compressing piston that there would be difficulty in getting enough air to do any good. That may be set aside, therefore, and suppose a less compression is sought. Another point would enter here; since the air to be compressed would contain moisture in summer. The effect of this water would be to lower the final temperature of compression and to raise the final temperature of expansion. If the air be compressed to one quarter of its volume, when its gauge pressure would be 45 lbs. per square inch, and at a temperature of 140°, it would on expansion have a final temperature of 32° only. Hence, to mix this compressed and expanded air with entering air at 80°, so that the mixture might be at 70° would require one part of air at 32° to every four parts at 80° $[(80 \times 4) + 32] \div 5 = 70$. A compressing plant to furnish one-fifth of the air required in proper ventilation of an audience room, or a hospital ward would entail such an enormous expense as would be prohibitory to the idea. To renew three times per hour the air of a building $60 \times 50 \times 40$ would require a set of compressors aggregating over 150 H. P. But it would be perfectly possible by the continued compression and expansion of the same air used dry, to cool the surfaces of an air duct or of a coil over which the air for ventilation might pass. This could also be done by use of any of the so-called ice machines now used in breweries and elsewhere, and which are replacing the use of natural ice for refrigeration in a variety of processes. These depend on the absorption of heat from surfaces when they are called on to supply the work necessary to vaporize a volatile fluid, or a gas which has been liquefied by pressure. It is debatable however, in the case of theatres or similar audience rooms, which are not to be cooled continuously, whether a small machine making ice all the time for use when needed, would not be cheaper than the large machine required to cool sufficiently the surfaces for the refrigeration of *large* volumes of air. In other words, let the air be cooled by artificial ice in which cold is stored, so to speak, rather than by metallic surfaces artificially cooled, if mechanical and commercial questions alone are to be considered.

As regards the use of ice, answering question I. of the correspondent "T.", the whole matter of greater or less moisture after leaving the ice depends on the humidity of the original air. If the air is so full of moisture as to be just ready to deposit dew, the air when it leaves the ice will be drier than before. That is, there will be less moisture per cubic foot. Air loses its power to contain moisture as it becomes cooler, and the moisture which the cooled air could not hold would be deposited on the ice. On the other hand, if the original air is drier than saturated air, it will take up moisture from the ice in a limited degree, just as it would from an equal surface of water at 32°. There can be no evaporation in the sense used by the correspondent in either case, and but a limited amount of moisture will be absorbed—certainly not enough to justify the term "dampness." The fact of the melting of the ice shows that it takes heat away from the air. It shows nothing as to the absorption of moisture. This depends solely on the humidity of the air before it reaches the ice. In the case of dry air, however, the air cooled by ice has less capacity to absorb the exhaled moisture which makes the atmosphere of warm audience rooms seem oppressive. Air of this dryness had better be cooled by dry metallic surfaces. In the case of air more nearly saturated, it would make no difference. The conditions inland will be different from those prevailing on the sea shore. In reply to question II. for temporary use, and where comparatively small quantities of air are to be cooled—as, for instance, in the case of President Garfield—natural ice is the cheapest. But where large quantities of air are to be cooled and the work is to continue, and where sufficient power and the services of an engineer are available, some form of refrigerating machine would be the most economical.]

A DANGEROUS IMPLEMENT.

We regret that the plumber's torch which is pictured here should be endorsed by the *Plumber and Decorator*, of London, because it is claimed to save time in the making of wiped and burnt joints. The flame is produced by lamp cotton steeped in benzoline spirit, and we would remind our contemporary that it is commending a thing that the local authorities should not tolerate the use of in any house.



Substantially the same arrangement, used by a plumber in this city to thaw out frozen pipes, caused the burning of a tenement house, and the loss of ten lives. Any appliance that requires naphtha, gasoline, benzine, or any product of petroleum should be excluded from buildings. The replenishing of the supply of gasoline to the torch caused the fire. There is quite risk enough with the ordinary plumber's furnace without taking chances with such explosives. The use of these torches is now prohibited here.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Jan. 27.....	21.80	18.44	21.28	25.71	28.84	19.27

E. G. LOVE, Ph.D., *Gas Examiner.*

GAS EXPLOSIONS IN THE STREET STEAM PIPE MAN-HOLES.

Two explosions of gas in the man-holes of the American Steam Heating and Power Company, occurred last week; the first on Friday, at the corner of Nassau and Fulton streets, followed on the next day by a similar one at Maiden Lane and Broadway. Several passers-by were slightly injured in each case and there was some destruction of property. The gas mains have been more or less disturbed by the work of the underground steam companies, particularly those of the East Side or American Company, and the odor of illuminating gas near the steam pipe man-holes has long been familiar to pedestrians. The escaping gas follows the line of the pipes and imperfectly refilled excavations, and naturally collects in the man-holes when there is nothing to drive it out. When steam is on, the heat and escaping steam forces most of it out, so that then there appears little danger of explosion; but so long as the steam is shut off for repairs, as had been the case in the American Company's pipes for several days previous to the explosions, the gas is likely to become quite dense. It was lighted in the first case by workmen of the Mutual Gas Company, who were searching for the leak with a torch, and probably in the second case by workmen of the Steam Company who were burning wood near the spot to thaw the frozen earth. No leaks in the gas pipes were found in either case near the place of the explosion.

These occurrences have suggested to the public an element of danger not generally apprehended. The leakage of gas through defects in the mains has always been a considerable item in the cost of carrying on the gas business. That this item is to be increased in certain districts seems certain considering the manner in which the mains are disturbed by the constant digging up of the streets. Just how the public in this city is to be protected from such accidents, we are unable at this time to point out. Other cities, however, should profit by our experience.

THE ELECTRIC LIGHT AT HARTFORD.

The question of the expediency of introducing the electric light for street illumination, was referred last November by the City Council of Hartford, Ct., to the Board of Street Commissioners for report. Their reply was submitted to the Council Jan. 22. They say that as regards cost they have not been able to obtain definite proposals, but from information received they are satisfied that a satisfactory arc light to burn all night would cost $1 a night for each light. To cover the territory named in the resolution, not less than twenty-four arc lights would be requisite, the cost of which for 336 nights all night would amount to $8,064. These would displace 147 gas lights, costing for same number of nights and hours $4,998, an increased cost of $3,066, or more than sixty per centum. If the 1,280 gas lamps are all displaced, the additional yearly cost to the city will be $26,700, Substituting the electric for the naphtha lights would extend this excess to the neighborhood of $30,000. The lighting of the whole city by electricity (on existing systems) would call for an annual expenditure of $75,000, or more.

The Commissioners think that the cost of the more brilliant light is in full proportion to the amount of light furnished, perhaps in greater proportion, and do not suppose that either the council or citizens generally wish to pay for an unnecessary amount of light. Such a degree of light as is needful to enable people to pass to and fro in the streets without special danger of accident by reason of darkness is all that public convenience requires, and all that the city wishes to pay for.

They believe that a system of incandescent lamps for streets and buildings will be perfected, so as to furnish electric light at a cost not exceeding that of coal gas. They also believe it best to await the perfection of devices for storing electricity for lighting purposes, rather than introduce the arc light now.

ELECTRIC LIGHT NOTES.

The lighting of the Royal Library at Brussels by electricity is reported not to have been successful. The flickering of the lamps was found very trying to the sight.

The City Council of Chicago have adopted the views of Corporation Counsel Adams that the Elevated Electric Railroad can only be built upon the petition of a majority of property owners.

One thousand one hundred and fifty-three patents were issued by the Department of Electricity of the U. S. Patent office in 1882. Of them 258 were for electric lighting, 141 for telephonic apparatus, and 110 for magneto and dynamo electric machines.

A Montreal photographer employs the Thomas-Houston electric light for taking photographs.

An electric light wire, not properly insulated, is stated to have set fire to a balcony of a cigar shop in New Orleans, the 17th ult.

Jacksonville, Fla., is discussing the introduction of the Mast system of electric lighting. The city has received an estimate placing the first cost of three towers 150 feet high with lamps and appliances at $8,000.

The electric light was used to enable the workmen who were executing the elaborately decorated ceiling of an Episcopal church in Savannah to continue their labor during the night.

Haverly's Chicago theatre will replace gas by Edison lamps. Between 1,500 and 2,000 16 candle power lamps will be used, for the stage as well as the auditorium. A tinted globe will be used.

Electricien says that experiments have recently been making for the application of the electric light to the trains of the Southern Railway of Austria, and in a few days the first electrically lighted train will be run from Vienna to Neustadt.

It is reported that a Birmingham, Eng., workman, employed by a sewerage contractor, found a number of underground telegraph cables. He placed a chain round them and hauled off three hundred yards or more of the wire and sold his trophy for old metal, interrupting the communication between England, New York, Paris, Ireland, Scotland, and other points for several hours.

The Commissioner of Public Works of Chicago has under consideration the proposition of the Western Electric Light Company to place an Edison dynamo in the City Hall, furnish 250 lights in that building for one year, and furnish 150 lights in the Washington and LaSalle street tunnels one year for $9,183.

The *Engineer* describes an electric clock for railway stations. The mechanism for giving the signals shows two discs, each pierced with 1,440 holes, arranged in spirals of twenty-four turns, with 60 holes in each turn. Small metallic pegs are inserted in the holes corresponding to any given minute and hour, and the contact of these with an electric conductor allows passage of the current for the signal. When any change is made in the time of starting trains, the pegs are shifted. One, two, three, or more successive and different signals can be given for each train.

Meter-ites.

During the season ending Dec. 31, 1882, there were, in Montreal, 13 lamps broken by carters, 94 lamps broken with sticks, stones and snow, 722 lamps turned off, 584 lamps blown out by the wind, 659 lamps stopped by frost, etc., 2,036 panes of glass broken and 12 stolen.

Astoria, L. I. is supplied by a naphtha gas at the rate of $1.50 and $1.75 per 1,000 cubic feet.

The Gas Committee of the Leeds, Eng., Town Council, has carried a resolution that the rent for gas meters shall not exceed 5 per cent. on the cost of the meters, and such other charges as will meet their redemption.

In 1882 23 mining explosions were reported in England the number of deaths reaching 241, exactly the average for the past 32 years. Of 32 warnings issued 19 were justified by subsequent events, 12 were followed within three days by the loss of 139 lives in 15 explosions, and 66 lives were lost on the fifth and sixth days after the issue of warnings, in each case these warnings denoted a continuance of dangerous changes.

A process for the utilization of waste dust from coal has been described by Mr. W. H. Cory, an English gentleman, before the Engineers' Club of Philadelphia. It consists of mixing the coal with a small percentage of fine, dry fire clay and another small percentage of silicate of soda, and submitting the block to a pressure of one ton to the square inch. The blocks are then stacked to dry and in 24 hours (the chemical action of the alumina in the clay having converted the silicate of soda into silicate of alumina or into an insoluble substance, in that time) the blocks are fit for use and are as hard as ordinary coal.

A new process of coke burning, with the recovery of the volatile products of the coal, devised by Mr. John Jameson, is described by the Newcastle *Engineer*. It consists in drawing away gases and vapors from the bottom of the coke-oven by slight but steady suction, and condensing these products in a series of cooling pipes. The bottom of the oven is perforated, and into it is introduced the end of a suction pipe. Here it communicates with the condensing pipes, from which, at intervals, the liquid products are drawn off, whilst the incondensable gas is, for the present, allowed to escape. The suction pipe is, at the Felling Works, operated by a blower. The object aimed at is to extract such valuable elements, mineral oil and ammonia, of the charge as may be taken without adversely affecting the market value of the coke, and therefore this process is not proceeded with. The suction is so managed as to cause no actual passage of air through the charge.

In an address delivered at the Washington Convention of the American Society of Engineers, the late Ashbel Welch, President of the Society, said of the effect of the present activity on human welfare that "doubtless the preponderence of effect is good, but with many drawbacks." He noticed the following one:

The rapid movement of the business of the world requires an immense amount of brain work to be done by those who direct it in each business day. The brain gets no rest, as it would have got in old times; now constantly rushing forward, not standing in its tracks, as formerly, while the man was writing down the thought of the previous instant; now furiously at work, while formerly resting while the man was going from place to place. This kept up for six or eight hours a day must soon break a man down, and has already broken down some of our ablest men. It does not mend the matter much that next summer he can spend a few weeks at the shore, or among the mountains. A man running up hill till he is out of breath is not enabled to keep on running another hour by the prospect of rest next week. A man that runs a locomotive twenty miles an hour may run all day, but if he runs sixty miles per hour, and so his brain and eye have three times as much to do per hour, he must soon stop to rest.

Undoubtedly the progress of the age, which is so largely engineering progress, does on the whole greatly increase the welfare of mankind. By making the forces of nature do the hard work, the labors of the toiling millions are lightened many fold. The laboring man now works with brain and eye more than with muscle, and his business is now to apply some principle of science. This raises him intellectually. He now has time for improvement. Comfort and refinement, and even luxury are brought within his reach. The forces of nature having become obedient to the will of man, they are made to produce for him not only plenty, but conveniences and luxuries formerly undreamt of. By the present facilities the races of men are brought into contact with each other. Those races are being assimilated, and the prejudices and hatreds of the past are fading away. Supreme power among men is more than ever in the hands of the most enlightened, and they are sending civilization and Christianity into the regions most benighted. The light of heaven is beginning to shine into the harem and the zenana. And the time seems to be hastening when there shall universally prevail "peace on earth" and "good will towards men."

S. H. Martin, Chief Inspector of the Board of Health of Philadelphia, received during 1882, 7,674 complaints, of which 1,938 were dismissed, 5,736 declared nuisances prejudicial to public health and the parties concerned notified to abate the same, of which 3,941 reported as having been complied with, and 1,791 returned as not complied with. The principal complaints were: Filthy condition of houses and rooms, 390; courts and alleys, 325; yards, 287: vacant lots, 152; horse and cow stables, 83; manure pits, 79: stagnant ponds of water, 66; slaughter houses, 39, and bone boiling and fat rending establishments 15,—*Chronicle Herald.*

The State Board of Health of West Virginia, at their meeting in Wheeling the 13th ult., passed a resolution to be forwarded to Congress commending the National Board of Health, and requesting the removal of the restrictions placed upon the Board by Congress.

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A VERY BAD JOB.

SALT LAKE, *Jan.* 15, 1883.

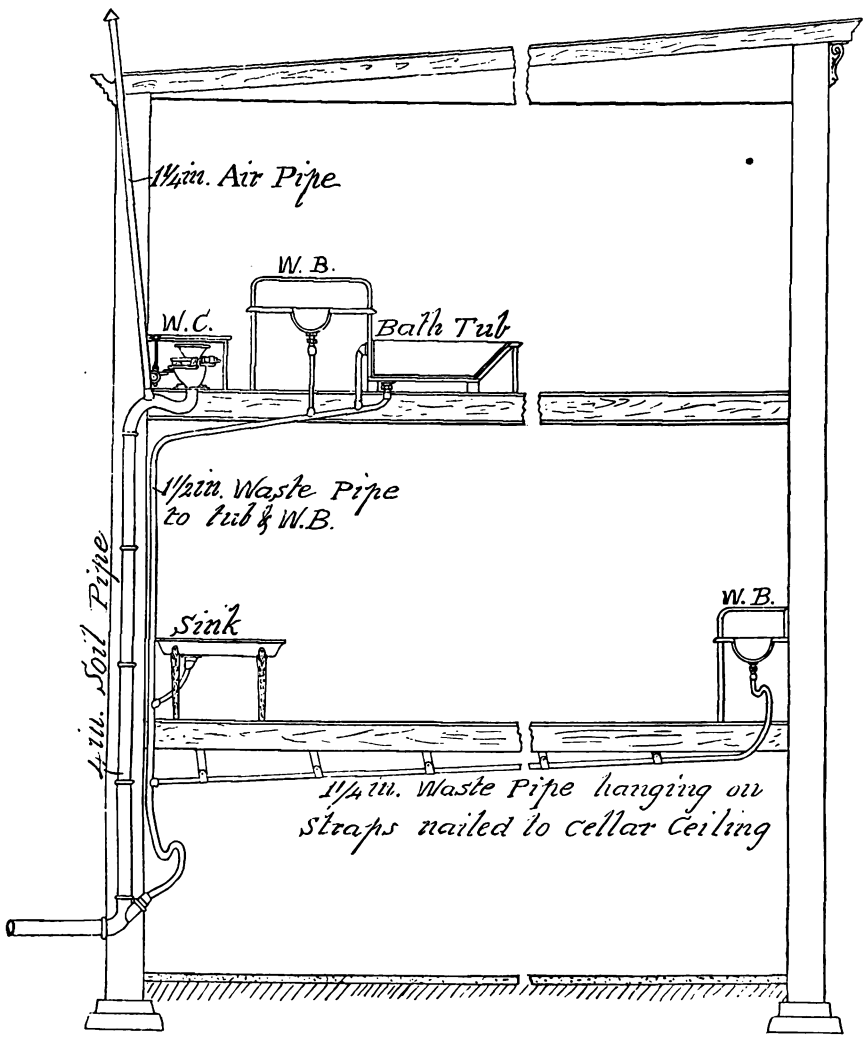
To the Editor of THE SANITARY ENGINEER:

Enclosed find a sketch of a *scientific* job of plumbing done by a would-be plumber, gas and steam fitter, a rising young man whose aim is to make people think he knows it all. He being a good talker, used it to good advantage on the owner, who thinks he has got a good job. The trap at closet has been stretched out till it looks like an offset, it also being fitted into the soil pipe, which is hanging by the trap, the bend going through the foundation wall. The air pipe, of which there is but one, is 1¼ inchs this pipe is also resting on the top of trap. The trap for bath and basin in bathroom is situated in the cellar; this also has been stretched out till it has no trap. The waste pipes are all run on the snake plan, thus: The waste for basin on ground floor is supported from the ceiling with straps. Joints on waste are bolted, and same on supply, only those on supply being rasped and sand papered, giving them a polished appearance. I think this will convince you the young man is going wrong.

I hope you will ventilate this.

Respectfully yours, E. H. R.

[We have seen some worse jobs than the one here described, but not many.]



EXPLODING WATER BACKS.

[From our Special Correspondent.]

CHICAGO, *Jan*, 25, 1883.

With the thermometer ranging below zero for four consecutive days, sometimes going as low as 24, Chicago plumbers have made hay in the past week.

I asked two of them, in view of the fatal explosion of a water back in Architect Burling's house, what was their best word to housekeepers owning these useful kitchen appliances. "My advice is," said each of them, in substance, "to let the water run constantly in severe weather. To simply shut off the water will not do, for though the water is 'all drawn off' as we say, there will still be considerable left in the water-back. The greatest danger from frozen pipes is when a sudden thaw comes on. They should never be left to thaw out of themselves, but should be attended to at once with hot water and cloths, and not of course by kindling fires beneath them, the cause, as I see, of not a few blazes in tenements the past week. Of course the best way to cure a sick pipe is to call in Dr. Plumber. Prevention however, is better and cheaper yet, and I repeat that in the case of water-backs and all other pipes, the proper course during a cold snap like the present, is to keep the fire in stove or furnace going constantly."

[THE SANITARY ENGINEER on page 277, issue of March 2, 1882, contained an illustration and suggestions for the guidance of householders in such emergencies.]

VENTILATING DRAINS BY THE KITCHEN STOVE.

The Hamilton, Ontario, *Times*, alluding to our criticism of a scheme proposed by it to ventilate sewers by the aid of a kitchen fire, says:

"The comments of our New York contemporary are rather amusing, in view of the fact, which the writer appears to have forgotten, that the plan of house drain ventilation described by the *Times*, and now so severely condemned by THE SANITARY ENGINEER was proposed by the same SANITARY ENGIEER about a year ago. It was from the columns of our learned contempory that the *Times* borrowed the idea, and in spite of its author's recent repudiation of it, the idea seems to us to be a good one. The air in an iron chamber connected with a furnace or range would be heated to 300° F. Being rarefied by heat, it must be drawn to the chimney flue, where there is an upward draught. A vacuum being formed in the hot chamber, the air from the house drain must rush in to fill the vacuum, and the draught continuing toward the chimney, the current from the drain must be continuous. This seems reasonable, and when THE SANITARY ENGINEER first described the scheme, it was stated that it worked admirably, even when the iron chamber was cracked and the connecting pipe leaky. Our contemporary's point about detailing somebody to "man the stop-cock," is not well taken. The idea of the *Times* was to apply the system only to houses in which a fire is kept in furnace or range, night and day, from fall till spring, and the stop-cock would be left closed all summer, dependence being placed for ventilation on the extension of the soil pipe through the roof, the opening of windows, etc. The *Times* is not a special organ of the Hamilton foundries, but it would like to know what new light THE SANITARY ENGINEER has received since it recommended the hot-chamber plan of house drain ventilation."

We regret that the *Times* has not been more explicit and given us the page and issue of THE SANITARY ENGINEER in which we made the recommendation in question. We have repeatedly criticized similar propositions made by correspondents and in other publications, but we are unable to recall a single instance where we have commended the idea. If the *Times* will kindly indicate where THE SANITARY ENGINEER ever spoke approvingly of such a device, we will promptly withdraw our commendation. That in the case of water-backs and all other pipes, the proper course during a cold snap like the present, is to keep the fire in stove or furnace going constantly."

THE FLUSHING OF CHICAGO SEWERS.

Under the title "What must we do to be saved?" Mr. Andrew Young, a Chicago plumber, read a paper before the Master Plumbers' Association of that city, in which he criticized pretty sharply the methods of the City Board of Health. The graphic description of the flushing of the sewers we here quote:

"The master minds who preside over that part of the bowels of the city, the sewers, wrestled with the problem of how to move the accumulation of mud and matter liable to settle in the sewers of the city. Great emergencies produce great men and methods. The Sewerage Department was equal to the occasion. A wagon was built, a tank added, and the vexed problem was solved. You have, no doubt, seen it. The tank is filled at the nearest fire-plug—the sunny side of the street in winter, the shady side in hot weather. Four to six men with rubber boots, oil-skin jackets and hats, accompanied by short clay pipes well seasoned, and with an unmistakable brogue, watch the process of filling. The tank filled, it is drawn to the nearest man-hole, the cover raised and its contents emptied into the sewer. The outfit includes a ladder. One of the men calmly and deliberately takes the ladder from its resting place on the wagon, and carries it, with the assistance of another, to the man-hole, placing its bottom in the sewer. The third man, knocking the ashes from his pipe, or giving it to an assistant to hold, descends the ladder. He returns. The ladder is taken up; two men carry it to its place on the wagon. A fourth man replaces the man-hole cover. The fifth man looks at the cover, when put back, to see if it is really there. They all fill and light their pipes, and the procession moves on to the next man-hole, where the process is repeated. This is called flushing the city sewers, and this in the city of Chicago.

"The expense of this outfit is $20 a day for horses and wagon. It has been in existence some fifteen years, and has cost money enough to have provided a sensible and feasible plan for flushing and cleaning the city sewers. The parks are the lungs of the city. Let us make them useful as well as ornamental. Instead of excavating for the lakes, have at least one at as high an elevation as the flow from the artesian wells will allow, this lake to be used for periodical flushing and cleaning of the city sewers. For other parts of the city, not convenient to the parks, let artesian wells be sunk and automatic flushing-tanks provided. The water from the wells already sunk is strongly impregnated with sulphur, which makes it valuable as a disinfectant and cleansing agent. These wells might be located in the center of our streets not occupied by car-tracks, made ornamental as fountains and useful as watering-places for man and beast. Here is a permanent remedy for foul sewers within our reach. Let us take advantage of it. Were this plan adopted, we might be able to dispense with that abomination of filth and corruption nursed under houses or nurtured in the yard, the catch basin. It ought to be done away with, except in rare cases. Not one practical plumber in a dozen can recommend it in connection with a private house; or if we must have something of the kind, let it be in the shape of a Field's or Williams' flush-tank."

Mr. Young thinks the sanitary condition of all places where food is sold should be strictly looked after.

"Take for example a building that has formerly been used as a saloon. The saloon-keeper, during his occupancy, put in urinals and water closets for the use of his patrons. He moves out, taking everything of value he put in. The building is now rented for a meat market. An ice-box is built. A tin-smith lines the box. A tin waste-pipe is made and carried to the sewer opening formerly used for the water closet, and communication is established between your beef-steak and the sewers of the city. This is no exaggeration. Not one ice-box in the dozen has its drips connected with any regard to sanitary laws. Every market or building about to be used as such, should be the subject of weekly inspection. Few of our citizens have any idea of the place where butter, eggs, cheese, game and poultry are stored and for sale upon South Water street, reeking with filth and refuse of all kinds, decayed vegetables stinking and too vealey veal, rotten fish, flesh and fowl. Take a walk through it and ask yourself the question: Can food be healthy, stored for one hour in such a place?"

The certificate of incorporation of the Rochester Sewer Pipe Company was filed the 24th ult. Capital $100,000.

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Correspondence.

SIZE OF WATER CLOSET OUTLETS.

To the Editor of THE SANITARY ENGINEER:

BOSTON, *Jan.* 16, 1883.

Will you please inform me what you consider the proper diameter (interior) for a water closet trap. I find many of the closets of recent make contract the diameter of the trap to *three* inches or even less. While a pipe of this diameter has the advantage of more thorough scouring at every flushing and might prevent many things from entering the soil-pipe, which have no business there, would it not be liable to be clogged when large or stiff paper is used, especially in public places? On the other hand, if the diameter of the trap is too large, the body of water to be moved is heavier, the scouring less, and, where 3-inch soil-pipes are used, as is now occasionally seen, danger of obstruction therein is greater. For hopper closets should you consider 3½ a good dimension?

Yours respct'y, "SUBSCRIBER."

[As 4-inch seems to be the size of soil-pipe most used, it is desirable that the outlet of a hopper, or water closet, should not exceed 3½ inches. With good flushing, we do not apprehend any trouble from stoppage, even if the outlet is only 3 inches.]

CATCH BASINS.

LYNN, MASS., *Jan.* 11, 1883.

To the Editor of THE SANITARY ENGINEER:

Please inform me whether there is any effectual design (patented or otherwise) of catch basin that in its construction provides against the escape of sewer gas into the street without the aid of any external trap appliances, and oblige,

Yours very truly, W.

[We do not exactly understand what Mr. W. means by *external* trap appliances. There are catch basins in use with a water seal, and also with a flap or valve seal. The latter are more likely to get out of order, and when open, usually permit of an escape of sewer air, together with the water. The former, if made deep enough to prevent evaporation in hot weather, and if precaution is taken to prevent leakage by making the masonry water-tight, or by using cast-iron instead, do not become objectionable, and are nearly everywhere preferred. The particular shape and size of the catch basin depends on local conditions. We know of no patent which is an improvement over the catch basin used in the best sewered cities.]

LOSS OF PRESSURE.

PITTSBURGH, *Jan.* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you please give me some information in regard to loss of pressure in low pressure gravity apparatus. For illustration, having ten lbs. pressure at the boiler, at the extreme farthest point from boiler I only have eight lbs., a loss of two lbs. Now I am aware that the pressure is equalized by a column of water equal to 1 lb. of steam. Now, how high will this water of condensation be over the water line of boiler? Or in other words, what constitutes a pound pressure of water in height? Some say 27", others differ, so I come to you a leading authority. I am a steam fitter and would like to know this point as it is valuable to me.

One more point: will a radiator tube closed at the top work on a hot water job successfully, if not will a return bend radiator answer?

By answering the above either in the THE SANITARY ENGINEER or by mail you will oblige

Yours respectfully R. A. ORR.

[The 27" is approximately correct but to be exact the temperature of the water must be considered. For instance, when the temperature of the water is 40° Fah., $2\frac{8}{10}$ feet high will exert a pound pressure on a square inch, but should the water be 200 degrees, then it will require a height of $2\frac{41}{100}$ feet to have the same weight.

No vertical tube radiator will do well for hot water. Return bend *coils* are the best.

CALCULATING AMOUNT OF HEATING SURFACE.

ST. LOUIS, *Jan.* 8, 1883.

TO THE EDITOR OF *The Sanitary Engineer:*

1. Having the cubical contents of a room, how do you find the necessary square feet of radiating surface in steam coils (direct radiation) to heat said room to a given temperature, say 70° in a given time, say two hours?

2. What is the best proportion of square feet of heating surface in boiler to square feet of radiating surface in coils?

3. How do you estimate the consumption of coal necessary to warm a building when the heating surface in boiler is known; also the square feet of heating surface in coils. Cubical contents of building being known?

Respectfully,

A. H. GOFF.

[1. There are so many factors of unknown quantity to take into consideration that we shall not attempt to answer this question. A room which was warmed yesterday and cooled only during the night, would warm in a very much shorter time than if it was cold for a month, the walls and the materials of the walls having to be warmed first. Again, the result would be different for rooms with very large glass surfaces, with iron surfaces, with walls furred and not furred, and anything which will control the rapidity of circulation of the air will effect the time.

A pound of water cooled one degree will warm 48 cubic feet of air one degree; and if it were possible to keep the air first warmed by contact with the hot surfaces from cooling, until all the air in the room was warmed, the condensation of one pound of steam would warm 1,000 cubic feet of air about 50 degrees during the time it takes to condense.

Assumed, now, that the rapidity of condensation depends on the amount of surface, and that one square foot of pipe surface will condense ⅛ of a pound of water in an hour (a probable quantity for the circumstances), three square feet will warm 1,000 cubic feet of air in the hour; but on the other hand, should surrounding circumstances and natural circulation be equivalent to cooling the air four times in an hour, it will take 12 square feet of radiating surface to maintain the heat only, and about 15 square feet for the first hour, while warming up.

2. From 5 to 12 of radiator to one of boiler, according to circumstances.

3. A pound of coal *variously* burned in practice will evaporate from 6 to 10 times its own weight of water. If 100 square feet of radiating surface condense 33 pounds of steam in an hour, if your boiler is very good, you warm 100 square feet of radiator for the price of three pounds of coal per hour, which may vary to six pounds and more with poor apparatus.]

PRESSURE IN BOILERS.

OGDENSBURG, N. Y., *Jan.* 15, 1883.

TO THE EDITOR OF *The Sanitary Engineer:*

In a tubular boiler, with a pressure of 75 pounds of steam, is the pressure equal alike on all parts of the boiler, or is it greatest above or below water line? Please answer this through columns of your paper, to decide an argument and oblige a SUBSCRIBER.

[If to a boiler you attach two separate gauges, of sensitive construction and exactly alike, one on the top of the boiler and the other at the lowest point, the lower gauge will register the most. The difference between the gauges being one pound for about every two feet in perpendicular height of the water in the boiler.

The pressure is greatest at the bottom of the boiler, and the difference (always being the same) is *constant* whether steam is on the boiler or not.]

JOINTS ON IRON SOIL PIPES.

PHILADELPHIA, *Jan.* 15, 1883.

To the Editor of THE SANITARY ENGINEER:

"Subscriber" would find no difficulty in getting caulked joints to stand test, if he, or others, who complain of similar trouble, would use pure soft lead and good gaskets, and pour the lead, as hot as it can be, not burning the gasket, all with one heat, using, as you suggest, good soil pipes, with bells large and heavy enough to be properly caulked. The trouble is the pipe is too light and the joints too close, and many plumbers use old scrap lead; mixed with this is more or less hard metal; for packing they use old rags or paper. Those who use either of the above, bad pipes or bad lead and packing, must not complain if they do not have perfect work. The only way to get a good job is good material and good work, and you can apply as many tests as you choose. This is my experience after thirty-five years a plumber; it has never failed.

Yours very truly, JOHN WORTHINGTON.

1721 CHESTNUT ST.

UTICA, N. Y., *January* 17, 1883.

To the Editor of THE SANITARY ENGINEER:

In reply to yours, in number of SANITARY ENGINEER of January 11, for opinions of your readers in regard to lead caulked joints or flanges and bolts, as asked you by "Subscriber" of Boston, I would say that it is my opinion that for first-class plumbing work extra heavy cast iron pipe with rust joints is the best, and the only job that will stand water or air test. But as you rightly say, extra heavy cast iron pipe will stand caulking with lead perfectly tight if care is taken to do it. With properly mixed iron rust, it can be packed in where lead cannot be caulked, and will get tighter the longer it is in, so that in fact the soil pipe will lie as one piece. Light soil pipe will not stand the expansion of the joint. Truly yours, C. G D.

January 9, 1883.

I am informed that there is a system in use for pumping water for domestic purposes, the motive power of which is supplied by the kitchen range. I have seen no mention of it in your journal or elsewhere. If you know of such a system, perpaps others of your readers would be glad to have some particulars about it as well as B.

[Some years ago there was a pump that was operated in some such way as you suggest. We believe that it was called "Houghton's Pump." We are not aware that it is now in the market. If our readers know anything of it we shall be glad to hear from them].

PLUMBING LAW VIOLATION.

Several trivial and one serious case of violation of the plumbing law in this city, were reported last week.

THE JOURNEYMEN'S BALL.

The annual ball of the Brotherhood of New York Journeymen Plumbers of this city, took place at Irving Hall last evening. Occurring so late in our publication week we can only note that the committee of arrangements succeeded in making it as successful as the journeymen's gatherings always prove to be.

THE PROPOSED PLUMBING LAW OF THE STATE OF NEW JERSEY.

The following is the text of the bill introduced into the New Jersey Assembly, the 15th ult., for the registration of plumbers and the regulation of plumbing work in the cities and towns of New Jersey:

A Supplement to an act entitled "An Act concerning the protection of the public health, and the record of vital facts and statistics relating thereto," approved March eleventh, *Anno Domini* one thousand eight hundred and eighty.

1. *Be it enacted* by the Senate and General Assembly of the State of New Jersey, That on or before the first day of March, in the year eighteen hundred and eighty-three, every master or journeyman plumber carrying on his trade in any city, borough or incorporated town in this State, shall, under such rules and regulations as the Board of Health thereof shall prescribe, register his name and address at the office of the Board of Health of any such city, borough or incorporated town; and after the said date it shall not be lawful for any person to carry on the trade of plumbing in the said city, borough or incorporated town unless his name and address be registered as above prescribed.

2. *And be it enacted*, That the drainage and plumbing of all buildings, both public and private, hereafter erected, or constructed in buildings already erected, in any such city, borough or incorporated town, shall be executed in accordance with plans previously approved in writing by the Board of Health of any such city, borough or incorporated town; suitable drawings and description of the said plumbing and drainage shall in each case be submitted and placed on file in the office of said Board of Health; the said Board of Health is also authorized to receive and place on file drawings and descriptions of the plumbing and drainage of buildings erected prior to the passage of this act.

3. *And be it enacted*, That any person or persons violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine of fifty dollars for each offense.

4. *And be it enacted*, That this act shall be deemed a public act and shall take effect immediately.

A bill to levy a tax of one mill on the grand duplicate of Cincinnati for the construction of trunk sewers in that city has been introduced in the Ohio Legislature.

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Food and Drugs.

PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The trial of grocers, charged by State Board of Health Inspector A. L. Colby, with selling adulterated food, was resumed at the Court of Special Sessions last Monday, the first case being that of Mrs. Anna Wedekind, of 1014 Second avenue, charged with selling adulterated mustard.

Counsel for the defendent moved to dismiss the complaint on the ground of uncertainty in the charge, "mustard" being applicable alike to the plant, the seed, and the preparation sold in the market; also that "flour," the alleged adulterant, was an indefinite term, and read the records of numerous cases in which the court had held similar charges indefinite and informal, and dismissed the complaint. This motion was denied.

The first witness was Mr. A. L. Colby, the Inspector of the State Board of Health, who testified that he purchased the sample of the defendant and on examination of a portion of it by chemical test and by microscope, found a considerable quantity of wheat starch in it from which he inferred that flour was mixed with the mustard.

Dr. E. G. Love, Analyst of the State Board of Health, testified that he had received from Inspector Colby a portion of the same sample and found on analysis that it contained beside mustard, wheat flour, ground gypsum and turmeric. The amount of starch found was 21.1 per cent. and as that constituted only about two-thirds of wheat flour, the mustard contained from thirty to forty per cent. of flour.

The manufacturer of the mustard, who was next called as a witness by the defense, admitted frankly that this percentage of flour was mixed with the mustard, claiming that the pure mustard flour was too strong for ordinary use, but denied having ever used ground gypsum.

Defendant's counsel then moved to dismiss the complaint on the ground that mustard was not food, but a condiment; that there was no intent on the part of his client to sell an adulterated article, and that the statute prohibiting such mixtures was unconstitutional. These motions were denied by the court, the defendant found guilty and sentenced to pay a nominal fine of $10.

George Bairn, Sr., owner of "Bairn's Tea Company, 981 Second avenue, and also of fourteen other stores, was next called and charged with selling coffee adulterated with 10 per cent. of chicory and also burned peas. He plead guilty and was fined $10. He now lables all packages containing mixtures with the names of the constituents. Owing to the large number of prisoners awaiting trial, the remaining cases were put over.

RULINGS OF THE STATE BOARD OF HEATH WITH REGARD TO MIXTURES.

The New York State Board of Health, at a recent special meeting, adopted the following resolutions which await the Governor's signature before going into effect.

"*Resolved*—That under and pursuant to Section 4, of Chapter 407, of the Laws of 1881, the following mixtures, when distinctly labeled in the manner provided in subdivision 7 of Sectiou 3 of said Act, are, within the conditions hereinafter prescribed, declared to be exempt and permitted to be sold under the provisions of the said Act.

"1. *Coffee and chickory mixture*, to which no other substance or article is added, and in which mixture pure coffee shall not be less than fifty per cent. of the whole compound or mixture.

"2. *Mustard and wheat or rice flour mixture*, to which no other substance or article, or any coloring matter is added, and in which mixture pure mustard shall not be less than fifty per cent. of the whole compound or mixture.

"The labels on the above mixtures shall be plainly and distinctly marked in letters of the same size as in the whole name of the mixture, so as to be read on one side of the parcel or package containing the mixture, in whatever quantity the same be sold, and the *proportions* of the two above designated *parts* of the said mixtures, shall in each case be distinctly marked and published on the said labels.

"*Resolved*—That under and pursuant to Section 4, of Chapter 407 of the Laws of 1881, the State Board of Health hereby fixes the limit of the variability permissible in cider vinegar, which shall not contain less than five per cent. of pure acetic acid, and shall not leave on evaporation less than one and one-half per cent. of solid matters, the same being weighed after drying as 212° Fahr.

"*Resolved*—That having considered other applications besides those for coffee and chicory mixtures, for mustard and flour mixtures, and for a standard of vinegar, the Board deems it inexpedient *at present* to authorize any other mixtures or fix any other standards, under Section 84, of Chapter 407, of the Laws of 1881."

SANITARY WORK IN NEW YORK.

SECOND ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF NEW YORK. Albany, 1882.

This is a handsome volume of 726 octavo pages, 48 of which are occupied by the report of the Board and the remainder by appended documents.

The report of the Board consists mainly of a summary of the appended reports. It makes no definite and precise recommendations to the Governor and Legislature, takes a rose-colored view of the situation, has no word of blame for any one, and appears to be abundantly satisfied with everything and everybody. It tells us that "The constituted local authorites of towns and villages are evincing their worthiness of the trust which successive Legislatures repose in them." The organized townships and cities being the units of which the State is composed, there is abundant reason for testing the willingness and ability of local sanitary authorities to perform the duties now required at their hands under the existing laws relating to the public health and vital registration. Without hesitation the State Board of Health has thus far endeavored to take all possible advantage of these laws in their obvious meaning, and of the best provisions of the local government organizations as found at the time available in the towns, cities, and villages, for giving practical effect to their laws, so far as this Board may participate in, or usefully influence the administration and execution of them."

It will be seen that this has the flavor of glucose rather than of acid or spice, and no doubt the local authorities will be pleased and surprised to learn of their efficiency, more so, in fact, than many of the people who have suffered from their ignorance and devotion to political, rather than to sanitary interests. We should have thought it worth while for the Board to have published a list or table of the local health authorities of the State which are actually organized and doing something for sanitary improvement, and we hope this information will be given in the next report.

With regard to the State system of registration of births, marriages and deaths, we are told that it is doing well and that "947 towns, 326 incorporated villages, and 18 cities have been provided with methods of vital registration." We should like to see a list of these towns, villages and cities, a statement of the number of births, deaths and marriages which they have recorded and reported, and also a list of those towns, villages and cities which are not keeping such records. The Board seems to be fearful of being specific in its statements, of mentioning names, of giving offense to any person or corporation; it speaks with bated breath, as it were, and in a vague and non-committal way—of any imperfections in the work of local authorities. For example, it says, "It is not improbable that the complete reorganization of local Boards of Health throughout the State, will insure the operation of all the necessary agencies and influences for complete as well as accurate registry in every community." The complete reorganization of Local Boards of Health throughout the State would, no doubt, effect much, but it seems to us that what it would effect depends a good deal on the nature of the reorganization.

As a matter of fact, we believe the report does not do the Board justice. It has really done a great deal of good work. The Secretary, Dr. Harris, has been a sanitary missionary among the smaller towns and villages, and it is to his personal visits, explanations and persuasions, that the existence of a large number of the present local health authorities is due. The selection of inspectors for special work, such as for the examination of malarious localities, inspectors of schools, etc., has been well made, and the reports from these inspectors given in the appendix, are of more than local interest. We commend especially the reports by Dr. A. S. Carroll, and Dr. Lincoln.

The reports of work under the Adulteration of Food and Drugs Act, take up more than 200 pages of the appendix, and have already been noticed.

Most of the other reports in the appendix have already appeared separately, and been noticed in this journal.

The volume is one that will be found interesting and useful by all sanitarians, and, as it becomes known, the demand for copies is likely to be large.

ANNUAL MEETING OF THE ILLINOIS STATE BOARD OF HEALTH.

The regular annual meeting of the Illinois State Board of Health was held at Springfield, Ill., Jan, 11 and 12, 1883.

The greater part of the session was occupied with the discussion of questions relating to Medical Education and the Working of the Medical Practice Act. The quarterly report of the Secretary, Dr. Rauch, was submitted, giving a summary of his monthly reports to the National Board on the immigrant inspection service. Resolutions were adopted endorsing the National Board of Health, as follows:

"WHEREAS, The act of Congress, approved June 2, 1879, by which the National Board of Health is charged with the duty of coöperating with and aiding State and local boards of health in the enforcement of their rules and regulations to prevent the introduction of contagious and infectious diseases into the United States, and into one State from another, will expire by limitation on the first of June, proximo: and

WHEREAS, The said National Board of Health has discharged this duty with so much of success, honesty of purpose and regard to economy—the specific details of its work being briefly summarized in the appended memorandum—as to conclusively demonstrate the value of a National agency for the protection of the public health; therefore, be it

Resolved, That the Illinois State Board of Health earnestly urges upon the Senators and Representatives from this State to obtain, during the present session, the legislation necessary to secure an extention of said act, pending the creation of a permanent National Health organization—such legislation to include a provision whereby the unexpended balances of the original appropriations may be reappropriated and made immediately available for the purposes of said act.

Resolved, That the Secretary be, and he hereby is, authorized to transmit a copy of this preamble, resolutions, and appended summary to each Senator and Representative from this State."

The election of officers for the coming year resulted as follows: President, the Hon, Newton Bateman, L.L.D., of Galesburg; Secretary, John H. Rauch, M.D., of Chicago; Treasurer, A. L. Clark, M.D., of Elgin.

The general feeling of satisfaction with the work of this Board is very well expressed in the following passage from the Governor's recent message:

"At the time of the organization of the Board of Health there were doubts in the minds of many good people as to its necessity, and for a time, much prejudice against its work. The doubts and prejudices, however, have gradually given way, as the Board has fearlessly and with prudence gone forward in the discharge of the work before it, until I think there is now an almost universal conviction that its services in protecting the people from contagious diseases and from the evils caused by ignorance and charlatanry in the practice of medicine, as well as the general sanitary work of the Board, cannot be dispensed with. The acts creating this Board and conferring its powers would have proved a deal better if not enforced, as they have been, by a competent and determined executive agency; and it will be a gratification to the people of Illinois to know that in their enforcement the State Board of Health has exerted an influence which has been felt throughout the country in various ways; in the elevation of the standard of medical education, the suppression of fraudulent medical colleges, and the introduction of improved methods of establishing and maintaining an effective quarantine against infectious diseases, *their* services have done much to add to the reputation of our State at home and abroad."

ANNUAL CONTRACTS WITH PHYSICIANS.

CHAMPAIGN, ILL., *Jan.* 16, 1883.

To the Editor of THE SANITARY ENGINEER:

The suggestion of Dr. Phillips, as to employment of physicians by annual contract at a specified rate is an excellent one (page 131, Jan. 11, 1882).

But it is my impression, that a physician would not be permitted to make such an agreement, by the county and State medical societies.

Can you give infomation as to the correctness of this opinion? Yours truly,

N. CLIFFORD RICKER.

[Our correspondent's opinion is no doubt correct, and it was in view of this fact, that we remarked upon Dr. Phillip's proposition that we doubted whether physicians of good repute would be willing to make such a contract. It would be considered as offering to do work cheaper than other physicians, a sort of underbidding for practice which is considered to be ungentlemanly, or as the physicians would say, contrary to ethics. If the medical societies took the matter up and fixed the terms and conditions, it would of course do away with this objection.]

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LEPROSY AND THE MEANS TAKEN TO PREVENT ITS SPREAD AT MARACAIBO.

We have received from the National Board of Health, a copy of a report transmitted to it through the Department of State, by Mr. E. H. Plumachee, U. S. Consul at Maracaibo, relating to the leper hospital or lazaretto, established on an island near Maracaibo, in Venezuela, from which we give the following extracts:

"Although it is more probable that elephantiasis has existed in this country from a remote period, it is claimed by native authorities that until 1825 this section was free from this social scourge, and that in that year a native of Santo Domingo, suffering with the disease, landed at Maracaibo and spread the infection until it has finally culminated in a serious social problem.

"In 1828 the growing evil of leprosy attracted the attention of the more thoughtful, and the initiative was taken in this section by the renting of an island in the lake situated about four miles south of Maracaibo. * * *

"It was not until 1876, however, that a movement was fairly inaugurated, deserving unlimited praise, and which has continued with constant zeal and energy to the present day.

"At that period various ladies of Maracaibo set seriously to work to secure funds for the amelioration of the condition of these unfortunates, and for the vigorous prosecution of the task of apprehending and isolating in the lazaretto the cases of disease still at large, which had then assumed alarming numbers, such as to seriously endanger the sanitary future of this section. * * *

"Both in this country and in Columbia, leprosy is encountered in all its modifications, from the slight discoloration of the skin to the most horrible forms of mutilation, and the record of the various modes of treatment and their results, may be studied with much interest by the faculty.

"My visits to the island have much impressed me with its suitability, and the system in vogue cannot be too highly commended. The locality is designated the 'Isla de la Providencia,' is situated about four miles south of the city and enjoys a fresher and much more agreeable climate than Maracaibo itself. At present there are but about one hnndred and twenty-five patients under treatment, although it is believed that there are at least four hundred still at large in the city and its environs, who are being apprehended as rapidly as possible with the limited resources at the disposal of the Junta, who as yet have a certain income of only about twelve hundred dollars monthly.

"It was at first a mooted point as to whether marriages should be permitted among the patients, and after a lengthy investigation and discussion, it was finially determined that past experience warranted the almost certain belief tht such unions would prove unfruitful, and consequently several weddings have taken place, while others are in anticipation. It should be here mentioned that pregnancy has not as yet resulted in any of these cases, and should the theory of sterility be correct, it seems laudable on the part of the governing body to allow this alleviation of their woes to be extended to the wretched creatures under their care.

"The experiment, however, can only be made when both parties are lepers, as a union between a sound and a diseased person would almost infallibly result in the propagation of diseased offspring.

"The result of these marriages has been to induce more cheerfulness and resignation, and to add greatly to the good discipline of the institution. * * *

"The disease assumes various phases, the most common type being the tuberculous, manifested in distorted features, enormous pendant ears and lips and an abundance of exaggerated wrinkles. I have seen children of both sexes, of twelve or fourteen years of age, with the features and bearing of octogenarians, and the saddest cases that came under my notice were of this class. In persons of more advanced age, blindness and mutilation of the extremities are common.

"Fingers and toes drop off, or are peeled by off the patients themselves, without pain or loss of blood. In other cases the body is a mass of scales, or, perpaps, almost an entire ulcer.

"Opinions differ as to the possibility of radically curing the disease, but I regret to say that the records of this asylum give but little encouragement to the optimist. No authenticated report of absolute cure of a properly diagnosed case of leprosy can be cited during the fifty-four years of existence of the Maracaibo lazaretto.

"The present Secretary of Government, a physician of high standing, and who has received a European medical education, in a communication to the Junta, lays stress upon the arsenical treatment, not with a view to an ultimate cure, but simply as an alleviation.

"He takes the ground of the incurability of the disease, and inclines to the French theory of the medullar origin of leprosy as opposed to the German idea of its parasitical character.

"Here experience seems to demonstrate the correctness of the former theory, as, were the disease parasitical, it would no doubt be contagious, the reverse of which has been observed in this country.

"There is at present at the lazaretto a case in point, which speaks emphatically againt the possibility of the disease being spread by contact.

"About seventeen years ago, a woman was admitted, who has ever since suffered with elephantiasis of the most marked character. She was accompanied by her daughter, a child three years of age, who has ever since resided on the island, in daily intercourse with her mother, and who is now her constant attendant. This young woman, now twenty years of age, has as yet no symptoms whatever of disease, having a perfectly clear cuticle and complexion, and being in all respects in a normal condition, with very attractive features.

"It is very possible that she also may be ultimately afflicted, but if so, it will be from hereditary taint, and not from contagion.

"Other examples, more or less similar, could be cited, but this one will serve to sustain the theory." * * *

We have quoted somewhat fully from this report which is possibly a timely warning to this country. We have Leprosy in the United States at least three points, viz.: the Pacific Coast, Louisiana, and in the Northwest brought by Scandinavian immigration. The opinion of Mr. Plumachee that it is not contagious can only be sustained by making a special definition of the word "contagious" to suit the case. He says that in 1825 it was introduced into Maracaibo from the West Indies and in 1828, only three years after, was recognized as a growing evil.

How then had it spread? It could not be by heredity for children under five very rarely show it. The case which he relates proves nothing whatever except that a person having the hereditary taint is not endangered by contact which is very probable.

The best authorities insist on the importance of isolation and the prohibition of the immigration of lepers, and it is certainly common prudence on the part of communities to carry out these recommendations.

THE NORTH CAROLINA STATE BOARD OF HEALTH.

We are indebted to Dr. Thomas F. Wood of Wilmington, editor ofthe *North Carolina Medical Journal*, for the following report of the Conference of the State Board of Health of North Carolina, with the County Superintendents of Health at Raleigh, the 9th ult.

CONFERENCE OF THE STATE BOARD OF HEALTH WITH THE COUNTY SUPERINTENDENTS OF HEALTH AT THE CAPITAL.

Responding to a call sent out by the State Board of Health, and published in the *Journal* of December, a number of representatives of both bodies met at the Yarborough House, on Tuesday the 9th inst. The State Board was represented by Prof. Simmons, of Wake Forest, Dr. Geo. A. Foote, of Warrenton, and the Secretary of the Board. Superintendents of Health from several counties were present, as follows: Dr. J. M. Stansill, from Richmond County; Dr. J. E. Green, from Halifax; Dr, Geo. A. Foote, of Warren (who is also a Superintendent of Health and member of the State Board), Dr. W. T. Ennett, of Pender; Dr. James McKee, of Wake; Dr. J. J, Summerell, of Rowan; Dr. J. D. Roberts, of Wayne; Dr. J. W. Jones, of Wake Forest; Dr. J. G. Ramsey, of Rowan; Dr. C. Thompson, of Onslow; and subsequently Dr. Turner, of Moore, and Dr. Beall, of Davidson, were present.

Dr. Summerell, of Salisbury was appointed Chairman and Dr. J. D. Roberts Secretary.

The matters for consideration by the conference were explained by the Secretary of the State Board, as follows:

The amendments required to make the present law operative, could be briefly stated. The Governor in his message called the attention of the General Assembly to the fact, that although the Constitution of the State required the formation of a Board of Charities and Correction, the law had not been complied with, and that practically no such Board existed. The Board of Health had been working out the problem under the law.

The Governor had shown a true appreciation of the service the Board of Health had rendered the State, in suggesting a coalescence of the two laws. He saw in the Board of Health the elements necessary to success, and in it a hope for the future of the constitutional requirements as regards the sanitary condition of the charitable and penal institutions of the State. The original law had been put in the hands of Dr. C. Tate Murphy, a former State Senator, and Chairman of the Board of Charities and Correction, but upon his withdrawal from the public service, the whole work had fallen into desuetude. Dr. Murphy had also been an ardent supporter of the State Board of Health, until his failing health ended his career.

We do not forget that in the State of Massachusetts, the Board of Health of that State, had been merged into the Board of Public Charities, thereby impeding the work; but that State did not have an organization like ours. There was no good ground upon which detriment to our Board of Health could be prognosticated, by a future merging into the Board of Charities and Corrections. For was it not true that the State Board by aid of its auxiliary county boards had already taken up the work of the sanitary supervision of the jails, work houses and poor houses of the State? The State Board is on record in its "First Biennial Report," showing with how much care the work has been done, making a very strong and favorab e contrast with the unorganized work of the Board of Charities and Corrections, until the State Board of Health had demonstrated the practical working of a dead law, so that the North Carolina Board of Health really had nothing to fear of a coalescence which had been unconsciously in existence several years.

After this explanation by the Secretary, a committee was appointed to make a new draft of the law, incorporating the amendments proposed in the Governor's message.

The substance of the proposed law is as follows:

1. The State Board of Health to assume all the duties set forth in the law creating the Board of Charities and Corrections.

2. The composition of the Board to remain as at present.

3. The State Board to take cognizance of the health interests of the State, making all investigations necessary to obtain information about the introduction and progress of epidemics; to be sanitary advisers of the State; to make inspection of State institutions; to pursue special studies appertaining to their work, and when necessary to call in the assistance of experts.

4. The members to be elected and appointed as formerly.

5. The officers of the Board to be a President, Secretary, and Treasurer, the Secretary to receive such compensation as the Board may allow.

6. The auxiliary County Boards to remain as at present, and their duties to be as prescribed by law, and their salary to be left to the county and town authorities, but to be based upon the fees current in the county in which a Superintendent serves.

7. Directs the time of meeting of the State Board.

8. Provides for monthly reports of Superintendents to the Secretary of the State Board.

9. Refers to the conduct of inland quarantine, making the fine for its violation $200, and enjoining upon Superintendents to give all aid in their power to the maritime quarantine.

10. Directs the process for the abatement of nuisances dangerous to the public health.

11. Provides for the proper vaccination of persons coming under the care of the State and Counties; provides for a supply of vaccine to be kept by the Secretary; and asks for $200 for this purpose.

12. Provides for issue of Bulletins of warning, on matters appertaining to pestilential disease, and the means of preventing their spread; also provides for the circulation of information upon all topics which in the discretion of the Board affect the health interests of the people.

13. About special meetings of the Board.

14. Provides for analyses of water, food, drugs, etc., by the Agricultural Department.

15. Asking the State for $3,000 annual appropriation, and printing, and stationery necessary.

16. Repealing all laws conflicting with this.

The discussion of all the items entering into this bill was prolonged and earnest, and the final conclusion of the work reached, was left to the consideration of the friends of the Board in the Senate and House of Representatives.

We trust our efforts to the General Assembly with more confidence than heretofore, and we believe the prospects are good for a successful issue of our labor.

THE IMMIGRANT INSPECTION SERVICE.

The final report of Dr. J. H. Rauch to the National oard of Health, dated Jan. 10, 1883, gives a summary of the work performed during the season, from June 1 to Dec. 1, 1882. The total number of immigrants inspected during this time was 115,057, of which 21,618 were vaccinated by the inspectors; 3,242 of these were primary vaccinations, that is, were performed in cases which had never been successfully vaccinated, and were, therefore, entirely unprotected. Of the whole number inspected 57,302 were found to have been satisfactorily vaccinated before sailing or during the voyage, 3,127 had had smallpox, and 28,408 had been vaccinated at seabord quarantines.

The proportion of those vaccinated or re-vaccinated on shipboard rose from 22 to 29 in the hundred for the season; but the proportion of effective vaccinations on shipboard remained substantially the same—being a little under eight per 100 of the total number inspected in June, July and August, and a fraction of eight per 100 for the entire season. Of these ship-vaccinations about four in every 100 produced modified, and 24 in every 100 produced typical cicatrices; the remaining 72 per cent. were total failures.

The evidence presented as to the importance of this service should certainly be sufficient to ensure its continuance for the coming year.

Defective flues cause more fires in winter than anything else. But this is no reason why houses should be without flues. Yet that would be the logical sequence of the argument urged against sewers—that sewers are bad things, because, when defective, they leak sewer gas.—*Trenton State Gazette.*

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Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

APPARATUS FOR FEEDING LIQUIDS AGAINST PRESSURE.

The apparatus illustrated and described below is the invention of Wm. W. Rosenfield, a youth of seventeen and resident of this city. Its practical application thus far has been confined chiefly to the vaporizing apparatus of

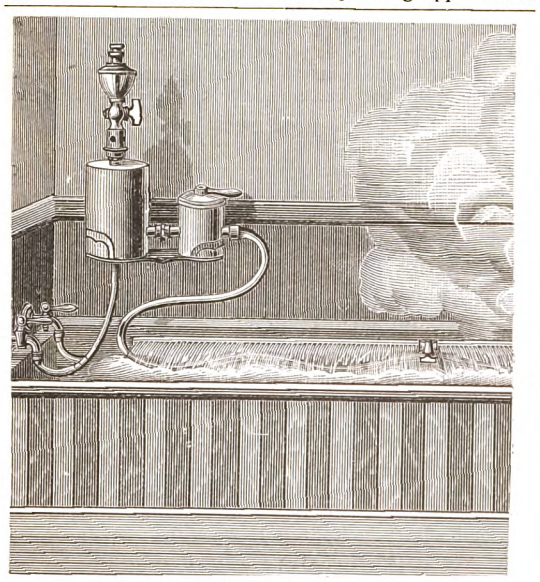

FIGURE 1.

the same inventor, in which it serves to admit liquid drugs to the hot water about to be vaporized by issuing from minute perforations in a tube, for the purpose of giving medicated baths, disinfecting, etc. It is claimed to work equally well as a lubricator, for feeding oil against steam

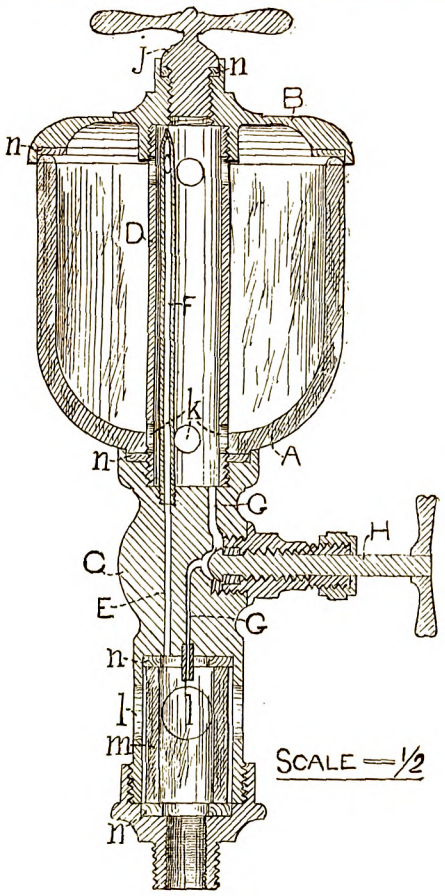

FIGURE 2.

pressure, but we shall consider only its application to the former apparatus, as manufactured by the Portable Hygienic Vapor and Disinfector Company, of 40 Spruce street, this city.

Figure 1 represents the combined apparatus for the production of medicated vapor as connected with a bath tub. Rubber tubes attached to the hot and cold water taps unite and enter the bottom of a hollow brass cylinder, about three inches in diameter and seven inches high, called the "air chamber." Above this is the apparatus for feeding liquid drugs into the water, which will be described presently. The water will compress the air in the air chamber and rise to a height depending on the head of water, but never filling the chamber so long as it remains air-tight, as it is intended to be. Thence, the water passes into a smaller cylinder beside the air chamber, provided for the reception of solid drugs (to be dissolved by the passing water) which are placed in a perforated inner cylinder by unscrewing the cover.

Figure 2 is a vertical section, on a larger scale, of the feeding apparatus, of a slightly different form from that shown in Fig. 1, but essentially the same. It consists, in brief, of a glass cup, *A*, for holding the liquid to be fed into the water, with a metal cover, *B*, both of which are held down to the casting, *C*, by a metal pipe, *D*, threaded at both ends; a small air-tube, *E*, through the casting *C*, extended by the pipe *F* nearly to the top of cup *A*, and another tube, *G*, through which the liquid passes down, its flow being regulated by the stop *H*. The liquid is introduced into the cup through an opening in the centre of the cover closed by the plug *j*. It falls directly into the pipe *D*, from which it passes out into the cup through holes (*k k*) near the bottom. The tube *E*, extended to above the surface of the liquid by the pipe *F*, allows the air from the air chamber to rise into the space above the liquid in the cup and restore the air above to the same density as that below, and thus offer no resistance to the flow of the liquid. The lower portion of the casting *C* is hollow with a thick glass lining, *m*, and has in opposite sides "peep holes," *l l*, to enable the attendant to see how fast the liquid is running. Washers, *n n*, of some vegetable preparation, are placed between the ends of the glass and the metal, to make air-tight joints.

Construction Notes.

GRANBY, QUEBEC.—The Council on Jan. 13, favorably considered the plan for water works proposed by Mr. Bourke. It contemplates bringing the water from Shefford Mountain, a distance of about five miles.

PHILADELPHIA.—At a meeting of Council on Jan. 24, an ordinance was presented relative to street paving. It provides that the Mayor shall obtain from the American Society of Civil Engineers, the Engineer Corps of the United States Army, and the Franklin Institute, the names of six engineers, and from these six names the Mayor to select three who shall constitute a Board of Experts to make a thorough and exhaustive report as to the best pavement for large cities.

A request has been presented to the Council that $125,000 of the surplus fund should be appropriated for constructing a bridge across the Philadelphia and Reading Railroad at Thompson street. The request was referred to the Finance Committee.

GLOUCESTER CITY, N. J.—Proposals will be received by the Mayor and Common Council until Feb. 13, for furnishing labor and materials for constructing water works.

TORONTO, CANADA.—The city council have accepted the bid of the Lander & Thorton manufacturing company for furnishing valves for the water works.

WORCESTER, Mass.—The council has voted to take Talmuck Brook, one of the tributaries of the Blackstone River, for an additional water supply. The stream will furnish twice as much water as is now available from the present sources. The cost will be from $300,000 to $400,000.—*Engineering News.*

PRINCETON, N. J.—The water company have made contracts with the Warren Foundry and Machine Company, for cast iron water pipe, with Tippett & Wood of Phillipsburgh, for the erection of an iron tank 20 feet in diameter and 60 feet high, on a trestle 60 feet high, and with the Eddy Valve Co., for gates and fire hydrants. The construction of the supply well and engine house and the laying of the mains will be advertised in a few days. The work is in charge of J. J. R. Croes.

CHICAGO.—The Comptroller's estimates for the year are just announced. They include provision for new bridges at State and Eighteenth streets, a new viaduct at Erie street, and for the completion of the canal pumping works. The totals are: for Department of Public Works, $1,202,874.81; for sewerage maintenance, $94,266.66; for sewerage construction, $245,513.61; for new City Hall, $90,718.73; a grand total of $1,633,373.81.

CHARLESTON, W. VA.—Bids for heating apparatus for the Court House were opened at the Treasury Department, Washington, the 24th ult, as follows: Kelly & Jones, $7,637; Bartlett, Hayward & Co., $7,948; Reuter & Mallory, $10,200.

BROOKLYN.—The contract for furnishing pipe and special castings for the Eastern District water main has been awarded to Mellert & Co., of Reading (Pa.) Iron Works, and to A. H. McNeill & Co., of Burlington, N. J., for $140,000.

WILMINGTON, DEL.—The Sewer Committee of Councils has engaged Mr. Rudolph Hering to examine into the feasibility of establishing a sewerage system. Mr. Hering's report will be submitted in a week or ten days.

ZANESVILLE, O.—A survey of the Zanesville, O., water works system is being made by Dr. Claude Martin.

CHICAGO.—The Detroit Bridge and Iron Works Company was awarded, Jan. 24, the contract for building an iron swing-bridge across the South Ward at Ashland avenue, at $10,500. The other bidders were: Kupers & Riddell, for $13,940; Delaware Bridge Co., $12,730 (for combined bridge, $35,980); King Iron Bridge Co., $13,875 (combined, $37,950); Roust & Coolidge, $11,695 (combined $32,440).

BOSTON.—Mr. William H. Bradley, Superintendant of Sewers, presented his annual report to the aldermen the 22d ult., which shows that the amount expended the past year was $243,195. There were built in the city proper, 8,001 feet, and in the suburbs about 30,000 feet of sewers. The total length, excluding the intercepting sewer, is about 204 miles.

Street Cleaning Commissioner Coleman after consultation with Mr. Andrews, counsel for the Corporation, has decided to appeal to the upper court from the decision of Judge Van Brunt continuing the injunction restraining him from awarding the contract for the removal of street refuse to the lowest bidder.

NEWPORT WATER SUPPLY.

The Water Company of Newport, Rhode Island, made application to the Supreme Court of that State for the condemnation of land adjoining the Company's storage reservoir, to an extent sufficient to admit of raising the dam three feet, and flooding such lands. The owners of the adjacent property objected to the raising of the pond, on the ground that sufficient storage capacity already existed for the wants of Newport for some time to come, that the quality of the water furnished from that source is now bad, and that it would be rather deteriorated than improved by the flooding of a large additional area of flat ground covered with a rich soil, that the risk of disease to the riparian dwellers would be greatly increased by the approach of the line of saturation in the soil several hundred feet nearer to their houses, and that even if it were necessary to increase the storage capacity in that pond, the desired object could be attained with less expense, greater security against pollution of the water, less detriment to surrounding property and probably at less expense, by deepening the existing pond, by excavating the shallow portions and placing the material removed on the banks. If still more room was needed it was asserted that it might be obtained by enclosing with a dam an area of land under water adjoining the present pond, and which had been given by the City of Newport to George H. Norman, the builder and principal owner of the waterworks.

The expert testimony covering these points was given by George E. Waring, C. E., J. J. R. Croes, C. E., and E. W. Bowditch, C. E.

The Water Company called Alphose Fteley, C. E., and George H. Bishop, C. E., and Mr. Norman, to show that more storage capacity was needed, and that it was not customary in making storage reservoirs to excavate the bottom in shallow places, and that it would be very expensive to deepen the present basin by digging out parts of its bottom or to build another basin adjoining it, while the existing dam could be raised three feet at a cost of $10,000. To meet the testimony of Mr. Bowditch as to the bad quality of the water shown by analysis made by Dr. Smart

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for the National Board of Health, the Company had a glass of the Newport water poured out and handed to a witness who smelt and tasted it, and said it was good.

The Court granted the application of the Water Company, on the ground that the opponents of the application had not presented any plan which would cost less than that advocated by the Company. No attention was paid by the Court to the very decided statements of the experts as to the bad effect on the water of the large expanse of shallow water over mud flats on which there is now growing grass and cat-tails, and the additional detriment which the extension of the shallow pond would be over the expanse of highly manured and cultivated land proposed to be covered.

THE POLLUTION OF THE SCHUYLKILL.

Under date of January 13, 1883, Russell Thayer, C.E., Superintendent of Fairmount Park, reported to the Park Commission of Philadelphia that the impurities of the Schuylkill water was caused by tar and oil, discharged into the river at Manayuuk from the Gas Works, the bleach water from Paper Mills, the gas waste at Norristown and Reading, and the sewage of those towns, and Conshohocken, Pottstown and Phœnixville. He advises that efforts be made to have the Legislature pass a law creating a commission empowered to keep the rivers of Pennsylvania free from pollutions of this class, and thinks that the construction of intercepting sewers along the river front of the city, the completion of the East Park Reservoir and the possibility of filtering the water supply should be considered.

CINCINNATI'S SEWERAGE.

[From our Special Correspondent.]

The general statement can be made in regard to the sewerage of Cincinnati that "there is not a ward with perfect drainage facilities in the city. The construction of sewers for the most part is good, but they are not sufficiently extended or connected to effect a perfect drainage of any portion the city. The effect of acids upon limestone, and the want of durability in brick, as shown by the frequency with which small sewers are required to be taken up, it not being possible otherwise to repair them, led the city engineer to recommend the use of granite as more economical for inverts, curbs, catch basins and drips. The total length of sewers is about 48 miles, giving 20,000 available connections. And plans have been approved for 22 miles more. One of the strongest evidences of public indifference to the sanitary advantages of sewers is seen in the fact that thus far only 3,709 connections have been made, of which 362 were made the past year.

The plumbers of Cincinnati, so far as can be ascertained, have not attempted by any means of ventilating pipes or traps to make any provision against the entrance of sewer gas into dwellings, relying entirely upon the sewer ventilation which is effected by perforated manhole covers placed 150 feet apart. Besides, the grades discharged rapidly, and the trunk sewers are open at the ends. The old sewer outlets, however, into the river are submerged during a great portion of the year.

The new form of charter proposed for cities in Tennessee, by the Citizens' Reform Association, of Nashville, contains some unusual provisions. The council are forbidden "to make any appropriation of money or credit in the way of donations, festivities, pageants, processions or parades." Ordinances passed by the City Council shall not take effect until twenty days after such passage, unless they contain at the end of the ordinance the words, "this ordinance shall take effect from and after its passage, the welfare of the city requiring it." A "board of public works and affairs" is provided for, composed of three freeholders elected by the city council, and shall "devote their time and attention to the duties of their office and shall not engage actively in another business." The members of this board and all persons elected, employed, appointed or contracted with by them, are required to be persons who are not "related to the Mayor or any alderman or any member of the board, within the sixth degree of consanquinity under the civil law."

Fires in London during the week ending Dec. 18, were 46, as follows: Causes unknown, 21; defect in flue, five; hot ashes, four; spark from fire, two; spirit lamp upset, two; and the following causes one each: clothes in contact with fire, overheat of flue, blocked up flue, oil lamp, cork dust falling on gas light, seeking an escape of gas with a light, candle, stove improperly set, overheat of furnace, vapor of spirits in contact with flame, children playing with fire, goods in contact with gas light. Fifty-six properties in the occupation of 66 tenants, were injured.

A panic was created in a Philadelphia school house the other day by an alarm of fire. The only means of egress from the school rooms was by a long narrow stairway, and several of the children were injured while trying to escape down it. Others attempted to jump from windows but were prevented.

Building Intelligence.

NEW YORK CITY.

Irving pl, No. 64, br candy fac, cost, $20,000; o, John S. Huyler, a, Hy, Palmer; b, not selected....15th st, No. 402 E, br ten, cost $10,000; o, Peter Butterly; a, M. N. Salmon....1st ave, No. 436, br fac, cost, $5,800; o, Carl H. Schultz; a, E. E. Raht; mason, R. L. Darragh & Co.; car, not selected....48th st, n s, 100 w 10th av, fourteen brown st ten, cost, each, $20,000; o, Charles Reilly; a, J. C. Burne; b, not selected....49th st, s s, 100 w 10th av, ten brown st ten, cost, each, $12,000; o, William Rankin; a, C. F. Ridder, Jr.; b, not selected ...51st st, No. 554 W. one br ten, cost, $10,000; o, Catharine Dettling; a, C. F. Ridder, Jr.; b, not selected... 8th av, s e cor 57th st, brown st front apt house, cost about $100,000; o, Augustus F. Holly; a, Wm. Baker; b, not selected....Lexington av, n e cor 80th st, br apart house, cost, $50,000; o, Mrs. Mary A. White; a, H. J. Hardenbergh; masons, Moran & Armstrong; car, not selected.... 121st, n s, 75 e 4th ave, br dwel; cost, $6,500; o, John Fullam; a, W. J. Merritt....130th st, s s, 160 e 5th ave, br and terra cotta ten, cost, $73,000; o, J. W. Aiken; a, Hubert Pirsson & Co.; b, John Harney and J. Geagan... 144th st, s s, 130 e 3d ave, fr ten, cost, $6,000; o, Mrs. E. Tegtmeyer; a and car, J. C. Stichler; mason, John Freese ....Brook av, n e cor 144th st, fr ten, cost, $5,000; o, John O'Herran; a, J. F. Burrows....Pine and William sts, office building. For the Commercial Union Assurance of London; cost, $80,000....84th st w Park ave, St Lawence's Roman Catholic Church; granite, with two steeples; cost, $350,000.

BROOKLYN.

Vernon av, n s, 300 w Tompkins ave, four fr dwels; cost, $3,500; o, Anna A. Fardon; 119 Carlton av; a and b, A. A. Fardon....Bedford av, n w cor Park av, five fr ten; Park av, n s, 70 w Bedford av, fr ten, cost, each, $7,500; o and a, J. G. Glover ...Chauncey st, Nos. 140 and 142, s s, three fr dwels; cost, each, $2,500; o and bs, Adams & Donaldson; a, Thomas Donaldson....Willoughby av, n w cor Sanford st, three-st mill, cost, $12,000; o, White, Potter & Paige Mfg. Co.; a, M. J. Morrill; b, not selected....16th st, n s, 176 e 5th av, br dwel; cost, $5,000; o, Patrick O'Hara; a and car, Thos. Corrigan; mason, Wm. Corrigan....Bushwick av, e s, 100 s Grand st, two fr ten, cost, $7,400 each; o, Mat. Brevie; a, Geo. Hillenbrand; b, Mich. Mersen....Oakland st, e s, 25 s Nassau av, three fr ten, cost, $3,000, each; o, Richard James; a, Fred. Weber; b, G. and J. Van Riper and Stephen M. Randall

ALTERATIONS, NEW YORK CITY.

Broadway, No. 53, add one st, interior alterations throughout, new st of iron; cost, 30,000 o, R. Goelet; a, J. M. Dunn; b, day's work ....Grand st, Nos. 85 and 87, br exten, cost, $30,000; o, Joseph Fisher; a, W. H. Hume; b, not selected...10th av, No. 723 front alt, iron work, also, first st par alt, cost, $2,500; o, D. Kniokmann; a, A. Pfund & Son....1st av, No. 434, new walls and foundations on n and e sides; cost; $2,500; o, Carl H. Schultz; a, E. E. Raht; masons, R. L. Darragh & Co.; car, not selected....5th av, No. 78 first st lowered, iron work, cost, $10,000; o, George Hillen; a, W. H. Hume, b, not selected....59th st, No. 139 E, br ex, cost, $8,000; o, Patrick H. McCaffrey; a, Jas. Barrett....32d st, No. 438, repair damage by fire, cost, ——; o, James Thompson; a, H. J. Schwarzmann & Co.....2d av, No. 468, raised one st, and br ex, int alt; cost, $4,500; o, Charles Bernhardt; a, Wm. Jose....Ganesvoort st, No. 50, add one st, int remod. front alt; cost, $2,000; o, Hermann G. Mohlmann; a, Wm. Graul.

San Francisco, Cal.—Sutter cor Polk, br bldg; cost abt $100,000; o, Sutter St. R. R. Co.; a, Kentizer & Raun; c, Mahoney Bros.... California cor Broderick, frame; cost $28,000; o, C. Blethen; a, G. E. Voelkel; c, Conrad & Miller....Steiner, x Pine and California, frame; cost $7,500; o. W. Trost; a, G. E. Voelkel; c, P. Laherty....Hyde nr Ellis, frame; cost $6,000; o, O. Dinsmore; a, Schmidt & Havens; c, Haskell & White....Sansome nr Jackson, br house; cost $5,000; o, Novello & Pitto; c, Novello.. . McAlister, nr Scott, frame; cost $20,000, o, C. Lind; a, Wright & Sanders; c, A. Flood....Sutter, nr Taylor, frame; cost abt $40,000; o, Mrs. Renton; a, C. Geddes; c, W, E. Stevens; car, Grant... Market, x 18th and 19th, frame; cost $6,000; o, Dr. Miller; a, H. D. Mitchell; c, F. W. Kern....Shotwell, x 22d and 23d, two tanks and frame; cost $7,000; o, Landers; c, Treadwell....Fulton, nr Polk, frame; cost $5,000; o, College of Pharmacy; a, Percy & Hamilton; c, W. M. Fletcher....Clay, nr Gough, frame cost $20,000; o, W. S. Wood; a, A. Laver; c, J. T. O'Brien.

Alterations.—Taylor, near Turk, raising and additions; cost $10,000; o, Mejasson; a, Huerne & Elliott; c, W. B. Kreger..... Franklin and McAlister, additions; cost $5,000; o, U. S. Brewery; a, H. Geilfuss; c, Fuchs & Hewe....Pine, cor Stockton, repairs to dwell; cost $30,000; o, S. Wilson; a, Wright & Sanders; day's work....Grove, nr Filmore, alterations; cost $3,000; o, H. Froomberg: a, T. A. Eisen; c, W. Wisecarver....Post, x Kearny and Dupont, alter. to Morton House; cost $16,000; o, E. Barron; a, P. J. O'Connor; c, Mahoney Bros....Clay and Sansome, add'ns to Niantic Blk; cost $8,000: o, Capt. Thompson; a, W. Patton; c, J. W. Wessinger.

San Jose, Cal.—Market st, br bldg; o, G. Peirano; a, Theo. Lenzen; c, J. Sbarboro....Nr Astoria, a sash factory is being built by Hansen Bros....A large hotel is being built at the new town of Ontario, by the Chaffey Bros.; c, A. W. Boggs....At San Diego a large fr bldg, br basement is being built; o, J. P. Christensen.. Healdsburg, fr blog for the Seventh Day Adventists; a, H. T. Bestor; cost $12,000; day's work.

Alteration.—At Bakerfield, add'ns to hotel; o, Mrs. E. Eitel.

St. Helena.—Fr dwell nr town; cost $5,000; o, Jas. Dowdle.

Oakland.—Point Station, add'ns to school house; cost $6,115; o, S. & J. Newsom; c, N. N. Hinckley.

Sacramento.—Fourth, x I and J; improvements; cost $4,000; o, J. McGuire.

Ogdensburg, N. Y.—Cornwall Ont, br school house, cost $17,000; a, J. P. Johnston.

Cincinnati, O.—Ohio av near Clifton and 3d av, br. cost 8,000; o, B. Klemmeror; b, Kennie & Rosenstiel. ...Richmond near Linn, four flats, cost $20,000; o, S. Kuhn; b, Pat. Murry.

Bridgeport, Ct.—Colorado st, 12 fr. cottages, total cost $18,000; o, A. C. Bussick; a. Henry Lambert; b, Bennett and Edie... Main st, Banking building, cost $75,000; o, Bridgeport Nat. Bank; a, Lambert & Bunnel.

Reading, Pa.—5th st, church improvements, cost $22,000; o, Presbyterian Cong.

Washington, D. C.—Cor Rhode Island and Connecticut avs, 3 story and basement, cost $25,000; o, D. R. McKee; a, Gray and Sage.

Detroit, Mich. Griswold st, repairs to telegraph block lately burned, cost $13,000; o, Buhl; a, Julius Hess.

Denver, Col.—South 15th st, br dwel, cost $9,000; o, A. A. Shaw; a, E. P. Varian....15 Larimer st, br dwel, cost $10,000; o, J. A. Cooper; a, J. H. Littlefield. Site selected for government Post Office.

Philadelphia, Pa.—1326-28-30 Ward st, br dwells; b, Daniel Carlin ....Alder and Grand avs, br dwell; N. S. Bowers... alter 920, 922 Chestnut st, fr and int alter; b, Jas. H. Errickson....1114 Market st, fr and int alter, 1-st back build; b, Jas. H. Errickson ....818 Arch st, rear and int alter; b, W. N. Jacquett.

Wheeling, W. Va.—Nothing at $5,000 reported this week.

Boston, Mass.— Unnamed st near Quincy st, 1 fr manufactury; o, Ada C Rice; b, Thos. Rice....Milton av cor Evans st, 2 fr dwel; o, H. N. Haskell: b, Stinson & Cleaveland.... Terrace av, 1 fr dwel; o, Judah Bacon; b, John C. Bassett....1 Harvard st near Water st, fr dwel; o, Samuel P. Faulkner; b, Samuel P. Faulkner .... 507-509 Medford st, 1 fr storage shed; o, Page & Littlefield; b, Page & Littlefield....315-321 Chelsea st, 1 fr currying shop; o, A. B. Porter; b, A. B. Porter....Halleck st, 1 fr wagon house; o, Geo. F. Burkhart; b, Geo. F. Burkhart ...Commercial st, 1 fr storage lum; o, McNeil Bros; b, McNeil Bros .... East 4th st, fr storage house; o, Jas E. Rowe; b, Henry Keyes....Rear of 360 Maverick st, 1 fr boat house; o, Belmont Boat Club; b, Wm. C. Chick....Terrace av, 1 fr stable; o, Jas. V. Chase; b, Jas. V. Chase....215 Commonwealth av, 1 br dwell; o, Jas. Lawrence; b David Comery & Co.

MISCELLANEOUS.

Norwich, Conn.—Water st, the Taylor b, Queen Anne style; o, Mrs. Oliver Tyler Roath.

Point Pleasant City, N. J.—Capt. O. L. Minton's new hotel, to accommodate 100 guests, will be finished and ready for occupancy about Feb. 15; also the hotel being erected on the ocean front, by Rev. F. F. Wilson to accommodate 125 guests is rapidly approching completion.

A bill introduced into the Tennessee Legislature the 23d ult., the governor is directed to appoint a commission of three to take charge of the erection of a new insane asylum in Eastern Tennessee. The commissioner shall select an architect to prepare the plans and $75,000 are appropriated to carry the bill into effect.

Newport, R. I.—On Conanicut st, a st cottage; cost $20,000; is being built for Mrs. Mary Wharton, designed by Chas. L. Bevins. The builder is J. D. Johnson who is also building six cottages for J. & Chas. Pinard, of N. Y., at cost of $25,000; C. L. Luce has planned a cottage for Job. Wharton to cost $50,000.....A villa of br st is being erected for Miss Catharine L. Wolfe, of N. Y., at a cost of $250,000, built by C. E. Clark, of Boston; a, Peabody & Stearns. Another Boston builder Lyman Wilcott has contracts for homes for W. F. W. Weld, of Boston and Col. Theo. M. Davis, of N. Y., at $50,000 each Jas. McNeill is building a villa for Mrs. Julia H. Eldridge, of Boston, to cost $50,000, designed by Dudley Newton of Newport. Nathan Barker builds cottage for Mrs. Mary L. Bruen at $18,000; Clarence C. Luce of Boston is architect for Dr. J. J. Mason's house to cost $30,000; b, N. Barker.

Rochester, N. Y.—Paul st, part of new block extending from Mortimer st; cost $7,000; o, Alderman Geo. W. Archer; a, H. & C. S. Ellis.

Chicago.—Dr. De Wolf and Commissioner Cregier will select plans and location for a morgue in this city, visiting other cities for that purpose....Architect Egan who some years ago planned the north side county buildings has been retained to set matters right there, as many complaints of offensive smells, etc., have been made. His recommendations will shortly be laid before the county board....Market and Monroe st, br mercantile house; o, J. V. Farwell & Co; of pressed br and br st, occupies a city square and said to be largest mercantile building in this country; 22 acres of floor room and 20,000,000 brick used. An Allis Corliss engine of 250 horse power is used for lighting by electricity, It can run 2,0 electric lights. An engine of 650 horse power generates steam to heat the building. The boiler fed by two duplex-Wellington feeders, are set in Butman furnaces formed to consume the smoke. The firm are said to do a business of $20,000,000.

Providence, R. I.—On Dorrance. Pine and Orange sts; o, Ed. S. Aldrich of firm of Whitford, Aldrich & Co., the firm to occupy it for wholesale grocery business; a, Robt. Manchester. The new structure to be of iron and granite, with fronts of Danvers and Trenton pressed brick; iron columns of unique designs; soapstone roof; copper gutters and conductors.

Florida.—Building at Orlanda has been rapid of late, at least one house per diem during past twenty months, 4 churches, a masonic hall, 2 new hotels opened since Jan. 1.

New York—The Board of Health have requested Mr. C. C. Haight, architect, to prepare plans for hospital building for contagious diseases, and additional hospital buildings on North Brothers Island. The Navarro department houses nr Central Park will accommodate 128 families; cost $5,000,000.

Brattleboro, Vt.—George A. Hines, architect. has been selected by the committee on competition designs for the new school house, the building of brick to cost $40,000 and seat 600.

Brookline, Mass.—O. F. Smith, of Boston, is the architect for the new alms house fr b.

Chattanooga, Tenn.—Br. b, cost $7,000; o, Temple & Shipp; a, J. E. Burdick; 3 st b; cost $10,000; o, Dedgen Bros; a, J. E. Burdick; also br dwel, cost $5,000; o, Dr. Baxter; a, J. E. Burdick.

Portland, O.—Four ten, cost $14,000; o, Henry Fleckenstein; a, J. Krumbein... br stores; cost $10,000; o, H. H. Northrup; a, J. Krumbein; c, Schaum & Davidson .. Residence and stable, total cost $50,000; o, R. Knapp; a, W. H. Williams....Plans for a three story build containing stores and theatre, are being prepared by W. H. Williams; cost $50,000.

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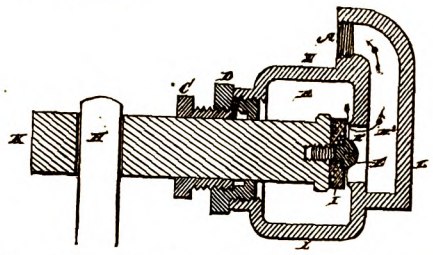
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

265,357. BALL VALVE. ALEXANDER G. ALEXANDER, Detroit, Mich. Filed Jan. 28, 1882. (No model.) Issued Oct. 3, 1882.

Brief.—The valve stem being about equal diameter as the valve opening the water pressure behind the valve will not exert sufficient force to hold it to its seat.

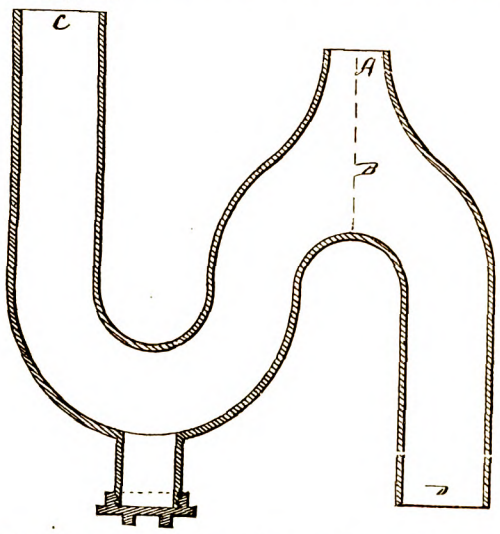


Claim.—1. The combination, substantially as herein described, of the shell or casing provided with an inlet and an outlet orifice, and divided into two chambers by a vertical partition having a lateral valve opening, the horizontally movable valve stem constructed of a diameter substantially the same as that of the valve opening, and a ball or float connected with the outer portion of the valve stem, essentially as and for the purposes set forth.

2. The combination, substantially as herein described, of the shell or casing provided with an inlet and outlet orifice, and divided into two chambers by a vertical partition having a lateral valve opening, said inlet and outlet connecting with the two chambers, respectively, the horizontally movable valve stem carry an attached valve, and constructed of a diameter equal or substantially equal to that of the valve opening, a pivoted swing lever connected with the outer portion of the valve stem, and a ball or float sustained by the outer end of the lever, essentially as and for the purpose described.

3. The combination, substantially as herein described, of the shell or casing divided into two upright chambers by a vertical partition having a lateral valve opening provided with a raised rim, the inlet and outlet pipes communicating respectively with the said chambers, a stuffing box in said casing, a horizontally movable valve stem arranged in the stuffing box, and constructed of a diameter equal or substantially equal to the diameter of the lateral valve opening, and a ball or float connected with the valve stem by a swinging lever pivoted to the shell or casing, the whole being constructed and arranged to operate essentially as and for the purposes set forth.

265,372. TRAP FOR WASTE PIPES. NICHOLAS BARRY, Jr., Muscatine, Iowa. Filed March 27, 1882. (No model.) Issued Oct. 3, 1882.



Claim.—The new article of manufacture, consisting of the trap for waste pipes, formed entire, and having a deep vertical chamber at B, a downwardly flaring vent, A, an inflow passage, C, an outflow passage, D, and a screw-tapped collar, all constructed substantially in the manner and for the purposes described.

265,481. WASH STAND. NATHAN O. BOND, Fairfax Court House, Va., assignor of one-half to Theodore J. Mayer, E. Kurtz Johnson, Fred W. Pratt, James L. Barbour, and F. Tenney, all of Washington, D. C. Filed June 2, 1882. (No model.) Issued Oct. 3, 1882.

Claim.—1. The combination, in a wash stand of a suspended bowl and hinged lid and connections, whereby an excess of water in the bowl depresses the lid and insures the discharge of the water, substantially as set forth.

2. The combination of the case, the hinged lid, and a bowl supported by arms connected to and supported by other arms attached to said lid, substantially as set forth.

3. The combination of the bowl and lid and jointed arms *g h* and stops *l*, substantially as specified.

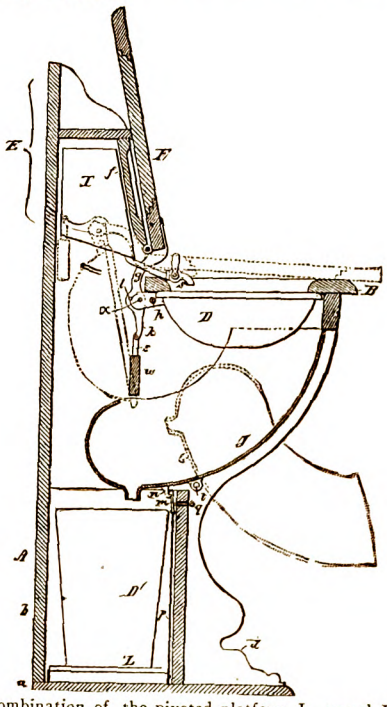
4. The combination of the bowl, the lid, arms connecting the two, a hinge forming part of said arms and arranged to connect the lid to the case, substantially as set forth.

5. The combination of the hinged and counterbalanced bowl and a cock, S, and connections, arranged as described, to close the cock as the bowl descends, substantially as set forth.

6. The combination of the bowl, pivoted to be swung down from a horizontal position, a counterbalance and auxiliary weight and devices, as described, whereby the weight is added to that of the bowl when the latter descends to additionally depress the same, as set forth.

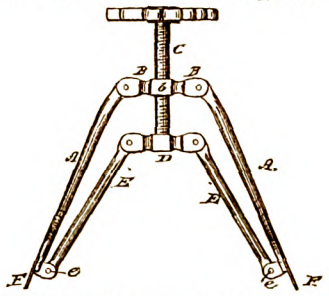
7. The combination of the bowl, pivoted to swing downward from a horizontal position, and the lid F, connected thereto, and connections between them, whereby the weight of the lid is added to that of the bowl as the latter descends.

8. The combination, with the swinging bowl, of a trough, J, and receptacle D[1], said trough being arranged between the bowl and the receptacle and pivoted to swing downward and expose its interior, substantially as set forth.



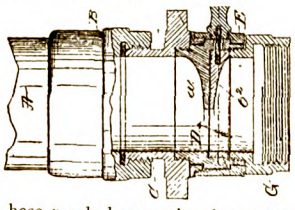
9. The combination of the pivoted platform L, vessel D[1], and trough J, with a catch retaining the trough, and means whereby the descent of the platform releases the catch, as set forth.

265,549. TINNER'S TOOL. JAMES M. URIE, Boulder, Colo., assignor of one-third to Frederick S. Hall, same place. Filed Aug. 16, 1882. (No model.) Issued Oct. 3, 1882.



Claim.—The expanding device, consisting of the cross heads B and D, having the hinged arms, A A and E E, plates or bars F F, and screw C, constructed and combined to operate substantially in the manner and for the purpose shown and set forth.

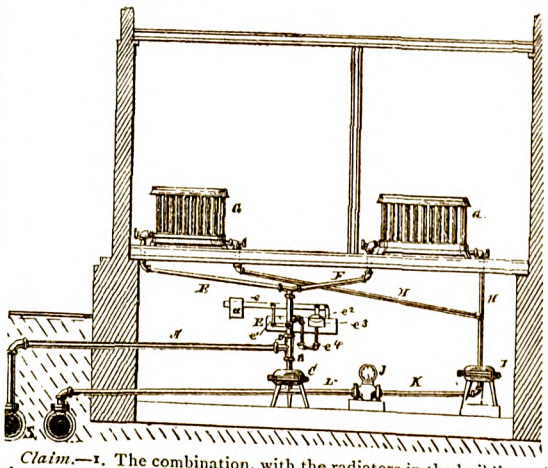
265,573. DISCHARGE PIPE FOR HOSE. CORNELIUS CALLAHAN, Chelsea, Mass., assignor to the American Fire Hose Manufacturing Company, same place. Filed May 25, 1882. (No model.) Issued Oct. 10, 1882.



Claim.—1. A hose nozzle having the threaded ring C and hose coupling section G, with the annular valve seat D *a* between them, combined with the valve ring *b b*[2] seated by the pressure of water thereupon, substantially as shown and described.

2. The valve ring *b*, having the portion *b*[2] and an operating handle, combined with the superposed and surrounding annulus D *a*, in which the valve ring and portion *b*[2] are seated by the pressure of water, the ring C, coupling G, and ring E, substantially as and for the purpose set forth.

265,601. APPARATUS FOR STEAM HEATING. WILLIAM E. HAXTUN, Kewanee, Ill. Filed March 14, 1881. (No model.) Issued Oct. 10, 1882.

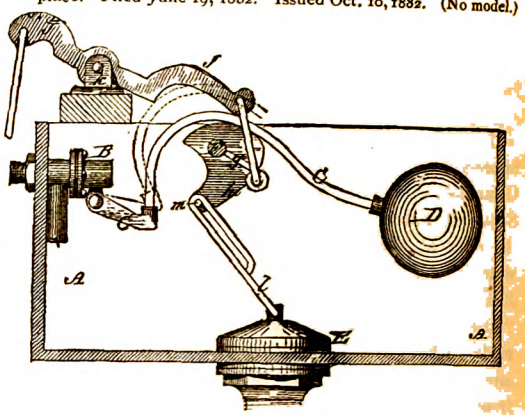


Claim.—1. The combination, with the radiators in the building, of the street steam-supplying main, the steam pipe connection between said main and the radiator, the pressure valve located at a point in said pipe connection between the main and the radiator, the trap C in a branch pipe between the main and the pressure valve, the pipe for returning the water of condensation back to the boiler house, and a pipe leading from the trap to the return water pipe, substantially as described.

2. The combination, with the radiator, of the steam-supply main S, pipe connection between the two, the pressure valve between the radiator and steam supply main and the pressure valve, the water trap I, connecting with the radiator, the water return pipe W, and pipe connection between the same and said traps, substantially as described.

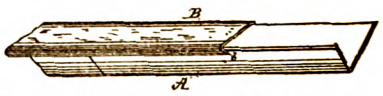
3. The combination with the radiator, of the steam-supply main S, pipe connection between the two, the pressure valve between the radiator and steam-supply main, the trap connecting with a branch pipe between the steam-supply main and the pressure valve, the water trap I, connecting with the radiator, the water meter J, pipe K, and return pipe W, substantially as described.

265,709. WATER-CLOSET TANK OR CISTERN. SAMUEL F. SNIFFIN, N. Y., assignor to Henry C. Meyer & Co., same place. Filed June 19, 1882. Issued Oct. 10, 1882. (No model.)



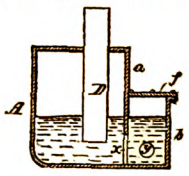
Claim.—In combination with the float-lever of the inlet valve and the outlet-valve, a cam-like lifter device flexibly connected to the outlet-valve and adapted to act directly on said lever of the inlet-valve, the construction being such, as described, that said cam-like lifter will come into contact with and hold up the said lever before it begins to operate to effect the lifting of the outlet-valve, all as set forth.

265716. DRAIN-TILE. JAMES TAYLOR, New Lexington, Ohio. Filed Aug. 17, 1882. Issued Oct. 10, 1882. (No model.)



Claim.—A drain-pipe consisting of the pipe-sections A, having turned flanged edges throughout their length, in combination with the pipe-sections B, having the edges throughout their length provided with the interlocking flange *b*, as set forth.

265,786. HYDRAULIC MAIN. WILLIAM R. BEAL, New York, N. Y. Filed July 24, 1882. Issued Oct. 10, 1882. (No model.)



Claim—1. A hydraulic main provided with the dip-pipes D, and with two communicating chambers, *a b*, the chamber *a* receiving the dip-pipes D and the chamber *b* having a detatchable cover and fastening devices, and communicating with the chamber *a* opposite each dip-pipe through an opening at the bottom of the chamber *a* and below the water-level, as set forth.

2. The hydraulic main having a chamber, *a*, and dip-pipes, and a supplemental chamber, *b*, provided with a removable cover, in combination with a stand-pipe, any suitable connections communicating with the chamber *b*, and an inflow water Pipe, F, connecting with the chamber *a*, substantially as set forth.

265,315. ELECTRIC LAMP. JOHN H. GUEST, Brooklyn, N. Y. Filed Nov. 22, 1880. (No model.) Issued Oct. 3, 1882.

266,362. HEATING STOVE. EDGAR W. ANTHONY, Boston, Mass. Filed June 15, 1882. (No model.) Issued Oct. 3, 1882.

265,368. HEATING STOVE. EDGAR W. ANTHONY, Boston, Mass. Filed May 22, 1882. (No model.) Issued Oct. 3, 1882.

265,364. ELECTRICAL LOW WATER DETECTOR. EDWARD H. ASHCROFT, Lynn, Mass. Filed June 2, 1882. (No model.) Issued Oct. 3, 1882.

265,365. ELECTRICAL ALARM FOR STEAM BOILER CLEANERS. EDWARD H. ASHCROFT, Lynn, Mass. Filed June 3, 1882. (No model.) Issued Oct. 3, 1882.

265,407. GAS COOKING STOVE OR RANGE. WILLIAM W. GOODWIN, Philadelphia, Pa. Filed June 30, 1882. (No model.) Issued Oct. 3, 1882.

265,408. BURNER FOR GAS STOVES. WILLIAM W. GOODWIN, Philadelphia, Pa. Filed July 15, 1882. (No model.) Issued Oct. 3, 1882.

265,410. ELECTRIC INCANDESCENT LAMP. JOHN H. GUEST, Brooklyn, N. Y. Filed Dec. 6, 1881. (No model.) Issued Oct. 3, 1882.

265,475. ELECTRIC LAMP. SIDNEY WATERS, London, England. Filed May 3, 1882. (No model.) Issued Oct. 3, 1882.

265,522. PORTABLE MOLD FOR CISTERNS. JAMES LOGAN, Waterloo, N. Y. Filed July 15, 1882. (Model.) Issued Oct. 3, 1882.

265,586. VAPOR BURNER. RUDOLPH FALKENRATH, Decatur, Ill., assignor to the American Vapor Stove Manufacturing Company, same place. Filed Feb. 28, 1882. (No model.) Issued Oct. 10, 1882.

265,587. GAS CUT-OFF. JOHN FARTHING, Chicago, Ill. Filed Aug. 21, 1882. (No model.) Issued Oct. 10, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JANUARY 20, 1883

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
North Atlantic Cities.																							
Portland.....Maine	34,519	14	21.1	2	14.2	1		5			1					2							
Boston.....Mass	407,581	172	21.9	53	30.8	8		34	3	3	6	2	3		5	17		8		3	2		
*Cambridge.....Mass																							
Worcester.....Mass	64,995	21	16.8	5	23.8	1		4				1	1			1					4		
New Haven.....Conn	66,979	29	22.5	12	41.3			3						1	1	2	1	3		2	1		1
Providence.....R. I.	114,723	51	23.1	12	23.5	3		12	1	1	1		10		1	1	2						1
Total	688,797	287	21.6	84	29.2	13		58	4	4	8	3	14	1	7	23	3	11		5	7		2
Eastern Cities.																							
Albany.....New York	98,430	72	38.0	24	33.3	1		7	6	1	2		2	1	2	3	2	1			1		2
New York.....New York	1,299,249	622	24.9	236	37.9	13	7	102	19	11	25	3	4	3	19	74		37		11	9		4
Brooklyn.....New York	633,763	280	22.9	108	38.5	4		41		2	15		2	7	17	31	2	16	4		4		1
Hudson Co.....New Jersey	228,025	107	24.4	45	42.0	3		16	6	2	4			1	5	8		5			4		1
Newark.....New Jersey	147,744	72	25.8	29	40.2		2	13	3	2	1		1	1	4	8		7			2		
Camden.....New Jersey	54,012	22	21.2	11	50.0			2					2		1	2		2			1		
Philadelphia.....Pa.	907,043	407	23.3	123	30.2	6		66	13		28	5	12	1	6	42	5	17				8	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	33	36.6	10	30.3	1		3	1	1	3		1			1		1					7
Total	3,415,155	1,615	24.5	586	36.2	28	9	250	48	19	78	8	24	14	54	169	9	86	4	11	21	8	16
Lake Cities.																							
Buffalo.....New York	168,702	60	18.4	25	41.6		2	6	3	2	2		3	1	8	2	1				1		
Rochester.....New York	92,116	32	18.0	7	21.8	1		8			1		3		1	1		2					
Syracuse.....New York	54,696	14	13.2	1	7.1	1		5								1					1		
Cleveland.....Ohio	192,084	56	15.1				1	3	5	1	7	2	1	1		7	1	1			1		2
Detroit.....Michigan	131,118	59	23.3	20	33.8			5	1	1	11		2	1	7	2		2					
Chicago.....Illinois	597,834	221	19.2	95	42.9	9	3	27	6		21	2	8	1	9	18	1	13			6	3	1
Milwaukee.....Wisconsin	135,233	57	21.9	24	42.1	1	1	5	4		2	1	1		2	5		3					
Total	1,371,783	499	18.9	172	34.5	12	7	59	19	4	44	5	18	4	27	36	3	21			9	3	3
River Cities.																							
Allegheny.....Pa.	89,038	30	17.5	6	20.0	1		6		1			3			4	1						
Pittsburgh.....Pa.	191,523	69	18.7	21	30.4	8		12			5	2	7			6		2			2	2	2
Cincinnati.....Ohio	267,767	120	23.3	47	39.1	3		16	3		3	2	3	1	11	4	1	4		3	1		2
Dayton.....Ohio	41,648	11	13.7	3	27.2	2		1								1							
Louisville.....Ky.	131,529	44	17.4	10	22.7	1		14			1			1		5		1	1			1	1
Indianapolis.....Indiana	86,529	31	18.1	5	16.1	1		5	1	1	1	1	1	1	1	1		3	3	1	1	1	1
Terre Haute.....Indiana	30,464	7	11.6	4	57.1			2			1					1							
Minneapolis.....Minn	98,026	32	16.9	15	46.8	1	4	2	5		5	2	2			1	1	2					
St. Paul.....Minn	53,683	13	12.6	5	28.4	1	1		2		2		1			2							
St. Louis.....Mo.	362,816	176	25.2	61	34.6	6		18	7	3	18		7	2	17	13		4			2		1
Total	1,353,023	533	20.4	177	33.2	24	5	76	18	5	36	7	24	5	29	38	3	16	4	4	6	4	7
Pacific Cities.																							
San Francisco.....Cal....(Dec. 12)	270,325	105	20.2	25	23.8	3	1	22	1	4	2		4			9	4	1					
Total																							
Southern Cities.																							
District of Columbia.....Wh.	136,471	45	17.1	11	24.4	2		10					1		6	3	1	2					
" .....Col.	71,103	35	25.6	18	51.4	2		12			2					4		1					
Richmond, Va.....Wh.	38,826	8	10.7	3	37.5			3	1							1							
" .....Col.	29,394	19	33.6	8	42.1	1		8	1							2							1
Charleston, S. C.....Wh.	22,699	11	25.2					3		1			2										
" .....Col.	27,505	21	39.4	8	38.0			3					1			2							
Atlanta, Ga.....Wh.	25,583	5	10.1	1	20.0	1			1													3	
" .....Col.	19,221	13	35.2	6	46.1			3		1			1			1							
Savannah, Ga.....Wh.	15,041	14	48.4					1					1	1		2					1		
" .....Col.	16,506	10	31.5										1										
Nashville, Tenn.....Wh.	31,993	9	14.6	1	11.1			1	1	1						2							
" .....Col.	19,406	22	58.8	8	36.3		1	7		1						3						1	
*Memphis, Tenn.....Wh.																							
" .....Col.																							
*Mobile, Ala.....Wh.																							
" .....Col.																							
*New Orleans, La.....Wh.																							
" .....Col.																							
Total White	270,313	92	17.7	16	17.3	3		18	3	2			4	1	6	8	1	2			1	3	
Total Colored	183,225	120	34.0	48	40.0	3	1	28	1	2	2		3			12		1				1	1
Total in U. S. Cities	7,551,621	3,251	22.4	1,108	34.0	86	23	511	95	40	170	23	91	25	123	287	23	138	8	20	44	19	29
Jan. 6,—Total in 28 English Cities	8,620,975	3,598	21.8			156				43	30		74		85					82		11	94
Jan. 6, " 8 Scotch Cities	1,219,586	690	29.1			25				13	22		11		14	163				10			55
Dec. 30, " 16 Irish Cities	843,553	562	34.6			26		54		13	2		5		13					2			10
Jan. 6, " 16 "	854,731	504	30.7			6		54		12			3		8					5			18
Dec. 16, " 167 German Cities	8,457,136	3,934	24.2	1,745		98		529	17		177		52		84					65	20	4	48

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending Jan. 20, in 36 U. S. cities, and for the week ending Jan. 12, in one, the whole containing an aggregate population of 7,551,621, there are reported 3,251 deaths, corresponding to an annual death rate of 22.4 per 1,000, precisely the same as the rate for the preceding week.

In the North Atlantic cities the rate was 21.6; in the Eastern cities, 24.3; in the Lake cities, 18.9; in the River cities, 20.2; and in the Southern, for the whites, 17.7, and for the colored, 34.0 per 1,000.

In San Francisco, for the week ending Jan. 12, the rate was 20.2 per 1,000.

This mortality rate is higher than that reported in English cities for the week ending Jan. 6, viz., 21.8; but it must be remembered that in these English cities, for the preceding week, the rate was 27.6.

The high mortality in the Southern colored population, *i. e.*, 34.00, is slightly exceeded by the rate in Irish cities for the week ending Jan. 6, viz., 34.6. Diseases of the lungs are now everywhere a prominent cause of death. Diphtheria gives an increased mortality, especially in the Eastern and River cities. It gives about the same rate of mortality in German cities as in this country.

Small-pox shows a decrease in the number of deaths reported, but there is good reason for thinking that in some cities the deaths from this cause are not all reported.

The Southern cities, with the exception of the District of Columbia, report no deaths from diphtheria, scarlet fever, measles, or malarial fever.

NEW YORK DEPARTMENT OF PUBLIC CHARITIES AND CORRECTIONS.—The report of Dr. McCann, who is the examining physician for the Board of Commissioners of Public Charities and Corrections, in New York City, shows that during the month of October, 1882, 1,479 persons applied for medical relief, of whom 1,457 were admitted to hospital. Of these 870 were male adults and 582 female adults, there being but five children. 233 were surgical cases, 140 were cases of alcoholism, and 236 diseases of the respiratory organs. 652 were sent to Bellevue Hospital, 345 to Charity Hospital, and 381 to Homœopathic Hospital.

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NEW YORK.—Dr. E. J. Darken reports that for the week ending Jan. 13 the Demilt Dispensary received 437 new cases, of which 103 were of chronic diseases and 191 surgical cases. the remainder 143 being cases of acute disease. Among these were three cases of scarlet fever, four of whooping-cough, five of measles, 11 of malarial fevers and 60 of acute lung diseases.

ALLEGHENY, PA.—Dr. J. H. Wright reports the prevalence of typhoid fever, and the freedom of the city from other contagious or infectious diseases.

INDIANAPOLIS, IND.—Dr. E. S. Elder reports that the death from small-pox recorded in the table is the first case of the disease. There is but one other in the city.

LOUISVILLE, KY.—Dr. Montgomery reports 11 cases of small-pox as having occurred during the week, five of these were isolated at their homes and six removed to hospital. The death recorded in the table occurred in hospital. There remain 40 cases in hospital and five in the city.

PITTSBURGHH, PA.—Dr. Snively reports one new case of small-pox.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 18 new cases of scarlet fever and five of diphtheria.

BOSTON, MASS.—C. E. Davis, Jr., City Clerk, reports 27 cases of diphtheria, 36 of scarlet fever and six of typhoid fever.

CLEVELAND, OHIO.—Dr. G. A. Ashmun, Health Officer, transmits reports for the weeks ending January 6, 13 and 20. The last is embodied in the table given above.

During the first mentioned week there were 54 deaths of which one was caused by violence, two by cerebro spinal meningitis, eight by consumption, two by croup, five by diphtheria, two by pneumonia, one by congestion of lungs and one by puerperal fever.

During the second week there were 68 deaths, three of which were caused by violence, two by cerebro-spinal fever, seven by consumption, four by croup, seven by diphtheria, two by typhoid fever, seven by pneumonia. one by congestion of lungs, two by acute bronchitis and one by puerperal fever.

LYNCHBURG, VA.—Dr. Thos. L. Walker, President Board of Health, reports the city free from small-pox.

ATLANTA, GA.—Dr. Jas. B. Baird states that two of the fatal cases of small-pox recorded in the table occurred in the small-pox hospital.

DETROIT, MICH.—Dr. O. W. Wight reports 24 cases of scarlet fever and 37 of diphtheria as having occurred during the week.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISL.—Dr. Franklin reports for the week seven admissions, three discharges, 2 deaths and 1,316 remaining under treatment.

NEW YORK QUARANTINE.—During the week ending Jan. 12 there arrived 1,871 immigrants, 549 of whom required and received vaccination. Dr. Wm. M. Smith reports that the surgeons of the European passenger steamships have established an excellent record for efficiency in their examinations of emigrants and the results of vaccinations.

WILMINGTON, DEL.—Dr. E. B. Frazer reports (Jan. 20) the occurrence of 30 cases of small-pox, nine of which have proved fatal, since the beginning of the year.

MICHIGAN.—Dr. Baker's report for the week ending Jan. 13, based on the observations of 60 medical men, shows the following diseases to have prevailed: rheumatism, bronchitis, neuralgia, tonsilitis, consumption, intermittents and pneumonia. Diphtheria was reported at 21 places in the State, scarlet fever at 17 places, measles at 14 places and small-pox at one place—Detroit.

HUDSON CO., N. J.—C. J. Rooney, City Clerk, in his report for December, an abstract of which will be given hereafter, states that the county death rate, 25.7, was 3.7 above the average rate for the six preceding Decembers, but was 3.7 below the rate for December, 1881. Jersey City's rate rose 5.4 above its average and was 2.6 above the county rate for December, 1882. Increased mortality from lung diseases was the chief cause of the higher rates. Small-pox was notable by its absence from reports, although at this time last year, 62 deaths from this cause were reported.

SYRACUSE, N. Y.—Registrar L. C. Dorwin, transmits a copy of his annual statement of vital statistics, for the year ending December 31, 1882. Total number of deaths 970. November furnished the smallest number 60, and January the largest, 107. Of the decedents, 288 were under five years and 199 over sixty years. Violence caused 54 deaths, cebro-spinal meningitis 6, consumption 186, croup 35, diarrheal diseases 69, diphtheria 11, erysipelas 4, typhoid fever 31, malarial fevers 25, scarlet fever 3, pneumonia 68, bronchitis 21, measles 1, puerperal fever 1, small-pox none, and whooping cough 9.

PROVIDENCE, R.I.—Dr. E. M. Snow reports that the increase in the deaths from typhoid fever this week, does not indicate any increase of the disease in the city. The decedents had all been sick several weeks. At the present time there are scarcely any new cases reported.

The annual report for 1882 from Providence, shows 2,242 deaths; males 1,080, females 1,162; white 2,147, colored 95; under five years 679, over 60 years 467. Causes: Accidents 76, cerebro-spinal meningitis 15, consumption 354, croup 32, diarrheal diseases 197, diphtheria 48, erysipelas 14, typhoid fever 141, malarial 3, scarlet fever 18, pneumonia 170, congestion of lungs 6, bronchitis 61, measles 4, and whooping cough 40. November gave the largest number of deaths, 247, June and October the smallest, 165 each. The last death in the city from small-pox, occurred in July, 1875.

ONTARIO, CANADA.—The Health Bulletin of the Provincial Board for the week ending Jan. 13 shows bronchitis to have been largely prevalent. Influenza, neuralgia, tonsilitis, anæmia and rheumatism follow bronchitis in order of frequency. Zymotic diseases are on the increase. "Small-pox outbreaks have again made their appearance. Forewarned is forearmed; *let the people attend to vaccination.*"

BERMUDA, WEST INDIES.—Consul Chas. M. Allen sends under date of Jan. 16 a copy of a communication from the mayor of St. George's to the *Royal Gazette*, proving by transmitted documents of an official character, that the town is free from contagious and infectious diseases. "I may add," says the mayor, "that the sanitary condition of the town has had the unceasing attention of the local board of health, particularly since the spring of 1882, and I may venture to assert, without fear of contradiction, that no part of Bermuda has been or is at this moment in a more healthy condition than this town."

HAVANA, CUBA.—Dr. D. M. Burgess reports for the month of December 535 deaths. Yellow fever caused 24, typhoid fever five, malarial fevers 17, diptheria one and croup three. Of the decedents by yellow fever eight were civilians and 16 belong to the military forces.

During the week ending Jan. 12, there were four deaths from yellow fever.

SANTIAGO DE CUBA.—Consul John C. Landreau reports 41 cases of yellow fever and 29 deaths from that disease during the month of December. The harbor and its vicinity is free from the infection.

RIO DE JANEIRO.—Deputy Consul General Jas. H. Murray sends reports for the weeks ending Dec. 16 and 23. Small-pox appears to be decreasing slightly. During the former week it caused 33 deaths, during the latter 28 deaths. Excluding small-pox from consideration the city may be regarded in good sanitary condition.

MARANHAM, BRAZIL.—Consular Agent J. J. Tavares sends reports for the three weeks ending Dec. 16, 23 and 30, showing the occurrence of 23, 19 and 27 deaths from small-pox.

GUAYMAS, MEXICO.—Consul Alex Willard, under date of Dec. 31, reports that the city is free from small-pox although this disease is understood to be prevailing in Maratlan and other ports along the coast.

ENGLAND.—The return of the registrar-general for the week ending Jan. 6, gives the average mortality rate in the 28 principal towns as 21.8 per 1000, that of Halifax 15.2 being the smallest, and Liverpool 30.9, the largest.

In London the births were 3.044 or 59 more than the average in the corresponding weeks of the last ten years, and the deaths 1,556 or 306 below the average. The deaths included five from small-pox, 50 from measles, 37 from scarlet fever, 21 from diphtheria, 31 from whooping cough, one from typhus and 21 from typhoid fever, and 15 from diarrhœa and dysentery. Seventeen new cases of small-pox were admitted into the hospitals, making 80 cases under treatment. The mortality rate in London was 20.5 per 1000.

IRELAND.—A summary of the returns transmitted by Consul A. B. Wood of Belfast is given in our table.

PARIS, FRANCE.—There were 1,169 births and 1,116 deaths during the week ending Dec. 27. Of the decedents 265 were under five years, and 275 over 60 years. Typhoid fever caused 66 deaths, small-pox 11, measles 16, scarlet fever one, whooping cough seven, croup and diphtheria 35, dysentery two, erysipelas six, consumption 199, pneumonia 87, acute bronchitis 44 and violence 27. Annual rate 25.9 per 1000.

During the week ending Jan. 4, there were 1,099 deaths, giving an annual rate of 25.50. Of these 303 were under five years and 266 over 60 years; males 576, females 523. Typhoid fever caused 71 deaths, small-pox 11, measles nine, scarlet fever one, whooping cough seven, diphtheria and croup 40, dysentery one, erysipelas ten, puerperal fever six, acute bronchitis 51, pneumonia 79, consumption 165 and violence 32. There were 84 cases of small-pox under treatment during the week, 940 of typhoid fever and 58 of diphtheria. The births during the week numbered 1,155.

During the last 13 weeks of 1882, there were 15,290 births in Paris and 14,178 deaths, as compared with 14,939 births and 13,098 deaths in the corresponding period of 1881. This large increase in the number of deaths is the result of the typhoid fever epidemic of which Paris has been the victim, as may be seen from the following figures:

	Typhoid.	*Small-pox.*	*Measles.*	*Scarlet Fever.*	*Diphtheria.*
4th quarter 1881.	433	119	152	48	619
4th quarter 1882.	1571	101	136	16	419
Increase in '82.	1138	...	...	...	...
Decrease in '82.	...	18	16	32	200

BRUSSELS, BELGIUM.—During the week ending Dec. 30 the death rate was 23.6 there having occurred 184 deaths in a population of 407,034 in the city and faubourgs. Of the decedents 66 were under five years of age. Small-pox caused six deaths, measles, scarlet fever, whooping cough and diphtheria one each, croup three, typhoid fever three, diarrhœa and dysentery 15, bronchitis and pneumonia 28, and consumption 19 deaths. The births during the week numbered 283, equal to an annual rate of 36.1.

VIENNA, AUSTRIA.—Consul General Jas. R. Weaver reports 352 deaths during the week ending Dec. 30, equivalent to an annual rate of 24.7. Small-pox caused two deaths, scarlet fever four, diphtheria two, whooping cough six, typhoid fever three, acute lung diseases 53, and consumption 84 deaths.

The report for the previous week (ending Dec. 23) gives 356 deaths. Small-pox three, scarlet fever three, diphtheria five, whooping cough four, typhoid fever three, diarrhœal diseases 15, acute lung diseases 50 and consumption 94. Death rate 25.0. Living births 450 or 33.2 per thousand of population.

ROTTERDAM, NETHERLANDS.—Consul Jno. F. Winter reports the prevalence of measles. During the week ending Dec. 30 eight cases of small-pox occurred one of which ended fatally.

STOCKHOLM, SWEDEN.—Consul Elfwing's report for the week ending Dec. 23, shows the occurrence of 107 deaths, males 45, females 62. Measles caused three deaths, scarlet fever five, typhoid fever two, whooping cough two, diphtheria four, croup four, bronchitis eight, pneumonia 16, consumption 16, diarrhœa six, and violence one death. Of the decedents 38 were under five years of age and 20 were over 60 years.

BARCELONA, SPAIN.—Consul Fred H. Schenck reports 272 deaths during the week ending Dec. 17. The death rate 44.17 is the highest which has obtained during the year. The increased mortality is attributed to atmospheric changes.

ST. PETERSBURGH, RUSSIA.—Consul General Stanton reports 700 deaths during the week ending Dec. 23; 335 occurred in persons under five years and 82 in persons over 60 years; males 381, females 322. Small-pox caused 28 deaths, fevers 29, and other contagious and infectious diseases 94 deaths. There were 71 patients in the small-pox hospitals, 906 in the fever hospitals and 1,203 in the venereal wards.

CALCUTTA, INDIA.—Consul General Mattson reports 344 deaths for the week ending Dec. 9, which is equal to an annual rate of 41. per 1,000. Cholera caused 89 deaths; this disease is confined mainly to the northern section of the town. The number of deaths from fevers amounted to 100; from bowel complaints 34, from tetanus 23, from consumption nine, from acute lung diseases 14, and from accident one.

MADRAS, INDIA.—The return of births and deaths in the municipality for the week ending Dec. 15, transmitted by Consular Agent L. Strange, shows a birth-rate of 45.3 and a death-rate of 42.4. The births numbered 346, males 174, females 172; the deaths 324, males 166, females 158. Small-pox caused two deaths, measles five, fevers 77, dysentery 26, and diarrhœa 13. No deaths from cholera are recorded.

MANILA, PHILIPPINE ISLANDS.—Acting Consul Chas. Klinck reports that by royal decree published in the *Official Gazette* Dec. 23 the port of Manila was declared free from epidemic cholera. All vessels arriving from the other ports of the island where the epidemic continues are subjected to a rigid quarantine of ten days.

SHANGHAI, CHINA.—Vice Consul General F. D. Cheshire reports a death from diphtheria during the week ending Dec. 19, and states that an outbreak of small-pox has occurred among the Chinese in the American settlement of Hong Kew—a number of children having died during the week. The disease has spread to the foreigners from their native servants and the laundries.

NAGASAKI, JAPAN.—Consul A. C. Jones sends copies of reports of the health of the province for the five weeks ending Dec. 2. During this period 64 new cases of cholera occurred and 40 deaths from the disease. The disease has been decreasing and the last report indicates that no cases remain under treatment.

ANNUAL MORTALITY RETURNS.

NEW HAVEN, CONN., *Jan.* 20 1883.

To Editor of THE SANITARY ENGINEER:

Can you tell me where I can find a published statement of the annual death-rate of the cities, of which you give us the weekly mortality?

The annual death-rate would afford some idea of the comparative salubrity of the different places.

The deaths in any given seven days is of little value for such a purpose.

Please publish the annual death-rate. It will be very highly appreciated by many of your readers, and greatly oblige,

Yours very truly,
C. A. LINDSLEY.

The annual death-rates of cities of the United States are not published anywhere in collective form. THE SANITARY ENGINEER is publishing weekly and monthly reports and ultimately hopes to be able to publish quarterly and annual reports. The weekly reports published are of value as warnings rather than for statistical purposes, but as they accumulate and are consolidated they will also be of statistical value. The great difficulty is to obtain reliable data. From New Haven it gets nothing.

BROOKLYN MORTALITY STATISTICS.

BROOKLYN, N. Y., *Jan.* 17, 1883.

To the Editor of THE SANITARY ENGINEER:

The actual mortality of the year 1882, in Brooklyn was 15,014 deaths by all causes. The estimated population of that year was 604,356. From these data we learn that the death rate in 1882 was 24.84 per 1,000 persons living.

Respectively, R. M. WYCOFF, *Sec'ty.*

For the work of his department next year, Commissioner of Health DeWolf, of Chicago, asks the Council for $121,527.50; the largest items being $18,000 for 20 sanitary police, and $6,500 for six tenement house and factory inspectors.

The bill introduced into the Pennsylvania Senate by Senator Adams to establish a State Board of Health provides for the appointment by the Governor of a board of six persons, a majority of whom must be physicians and one a civil engineer.

One result of the Milwaukee holocaust has been the discovering in Chicago, upon investigation by the Health Department, of 41 high buildings without fire escapes.

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ALFRED BRADY.

Alfred Brady, the well known iron founder and manufacturer of plumbers' castings, died at the Rossmore Hotel in the city, on the 22d inst. He had received a stroke of paralysis two days before from which he did not recover consciousness.

The deceased was born at Sing Sing, New York, in 1817, but removed quite early with his parents to this city, where he began his business life by learning the machinist's trade. The business which Mr. Brady had conducted alone for the past fifteen years, and which, it is said, had grown to be the largest of its kind in the country, was established about the year 1860, when he, in partnership with his brother, under the firm name of A. & G. W. Brady, opened an iron foundry at Nos. 37 to 43 Greene street, where the down-town salesrooms remained until last November.

Two years later the firm was changed to A. & E. Brady by another brother taking the place of the first. The latter style continued till 1868 when the deceased assumed the whole business under his own name and established foundries near the foot of West 55th st.

Mr. Brady received a very slight stroke of paralysis about a year ago from which he never fully recovered, though he continued to attend to business and even the day before the final stroke was in his Spring street office saying that he felt unusually well and vigorous.

He leaves a widow and one daughter. The funeral was held in Dr. Wilson's church (57th street, near Broadway), on the 25th, and the remains interred in Woodlawn Cemetery.

Mr. William D. Gardner has been chosen President of the reorganized Gas Trustees of Philadelphia.

Dr. J. Burdon Sanderson has been made Waynflete Professor of Physiology in the University of Oxford.

A real Russian nobleman drives a small-pox wagon in Chicago.

Professor A. H. Brewer, of the Sheffield Scientific School, has been re-appointed a member of the New Haven, Ct., Board of Health for three years.

In speaking (in our issue of Jan. 18) of Dr. Paton's transfer to the position of food inspector, from that of smoke inspector, we inadvertently located him at Cincinnati instead of at Chicago, his real position.

Now that Philadelphia's drinking water has a bad taste, enterprising druggists are mixing it with alcohol and bottling it to sell next spring as pure vegetable bitters.—*Chronicle Herald.*

A severe drought is visiting the northern part of New York State. At Plattsburgh the reservoir was drawn so low recently as to create fear of disaster in case of fire, and farmers in the region are obliged to go long distances for water for the cattle.

The Hartford City Council have passed a resolution bidding the Chief Engineer of the Fire Department and the Fire Marshal to make a thorough examination of school-houses, factories, hotels, tenement houses and churches, with respect for their facilties for escape in case of fire.

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Affidavit to the above effect in New York Papers of November 18th, 1878.

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Excavation on Frances Lane, Walnut Hills. Until Feb. 6. Address ANDERSON & HOVEY, *Civil Engineers*, 68 and 69 Johnston Building, Cincinnati, Ohio.

Dredging Saginaw River. Until Feb. 14. Address F. U. FARQUHAR, *Maj. Engrs. U.S.A.*, U.S. Engineer Office, Detroit, Mich.

Constructing an iron, truss or suspension bridge or covered wooden highway bridge over the Youghiogheny River. Until March 1. Address the McKEESPORT & YOUGHIOGHENY BRIDGE CO., McKeesport, Pa.

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Erecting two brick buildings for asylum near Milledgeville, Ga. Until March 1. Address JOHN HAMMOND, *State Lunatic Asylum*, Milledgeville, Ga.

Improving Altamaha River, Ga. Until Feb. 7. Address JAS. C. POST, *Capt. U. S. Engineers*, Engineer Office, N. Y. City.

Labor and material for erecting marine hospital building at Memphis. Until Feb. 15. Address JAS. G. HILL, *Supervising Architect*. Treasury Department, Washington, D. C.

Furniture for barge office, N. Y. City. Until Feb. 3. Address CHAS J. FOLGER, *Sec. of Treas., U. S.*, Washington, D. C,

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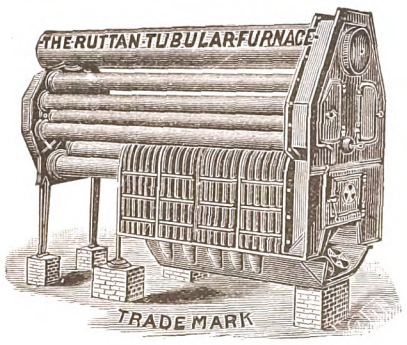

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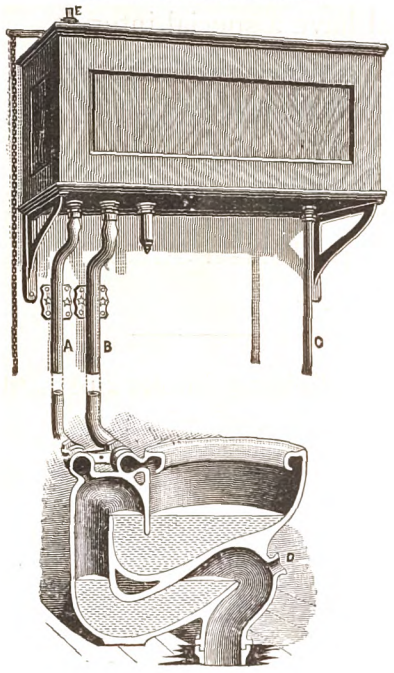

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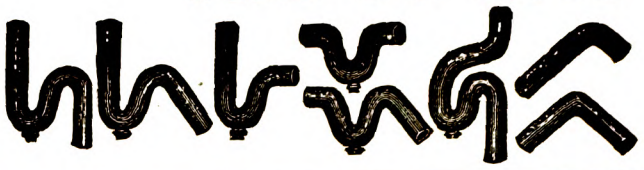

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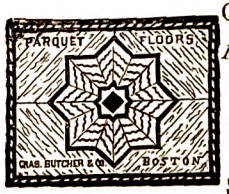

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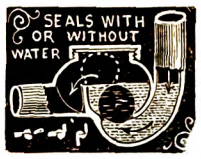

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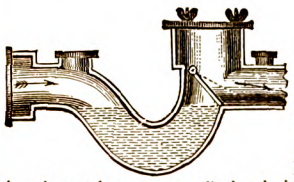

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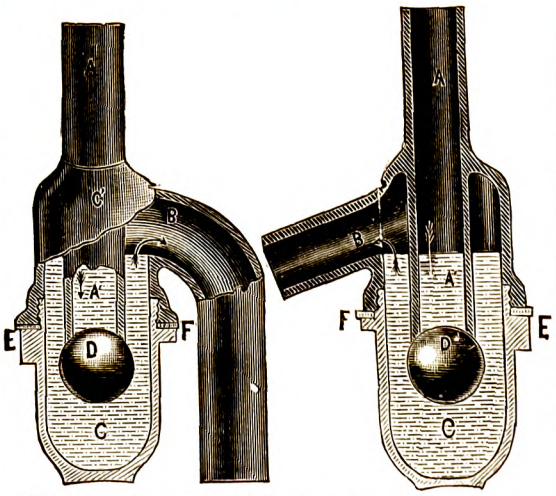

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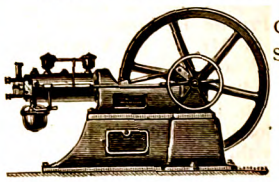

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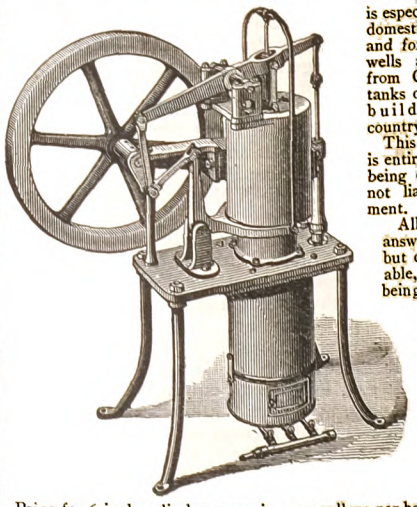

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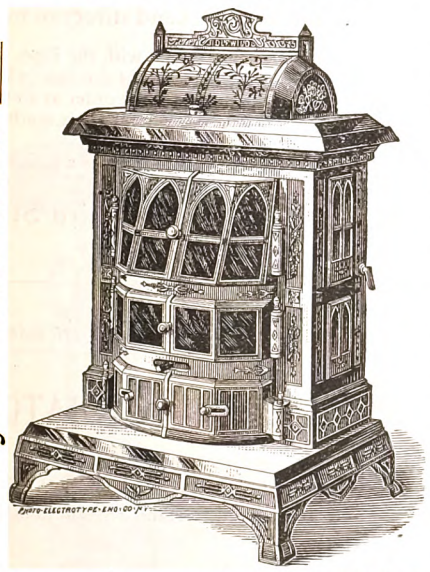

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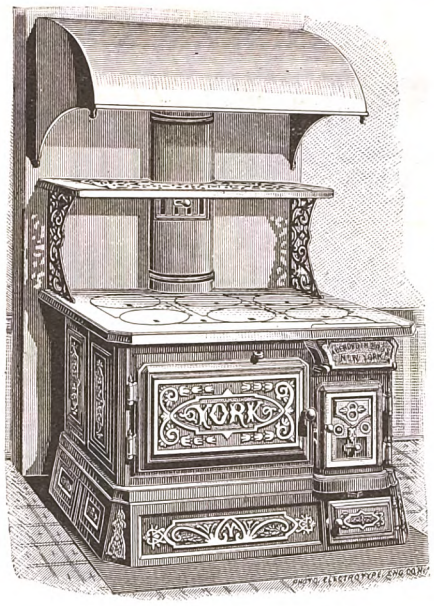

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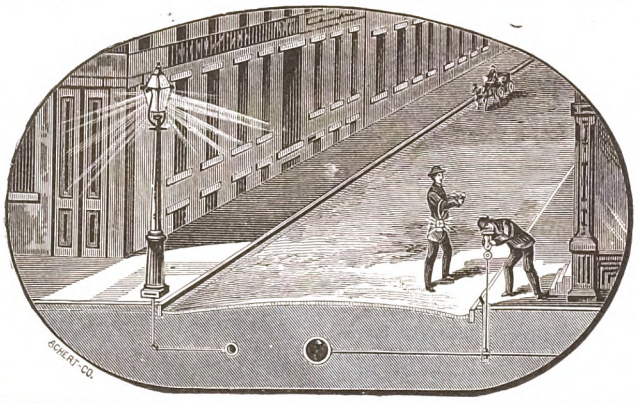

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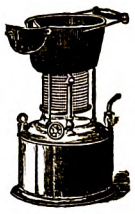

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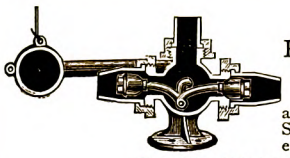

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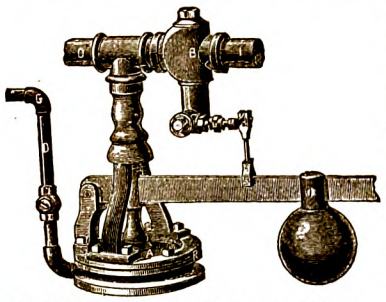

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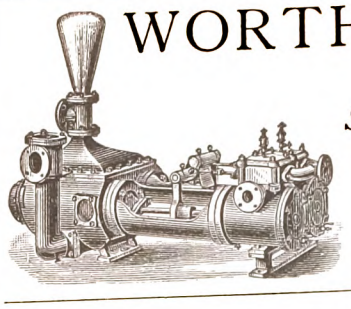

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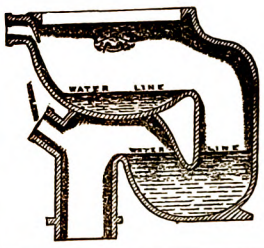

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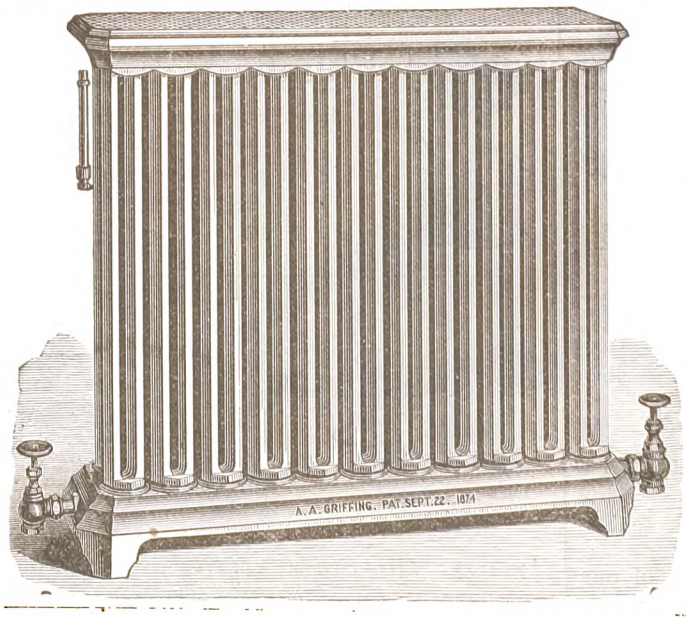

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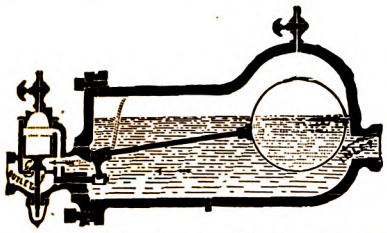

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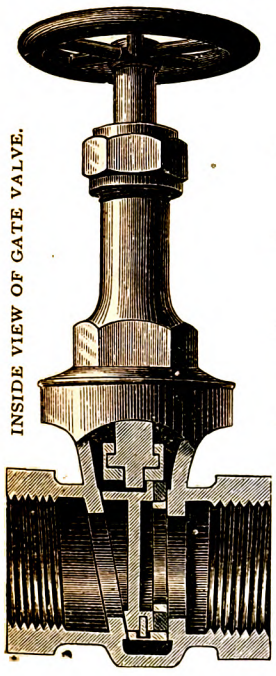

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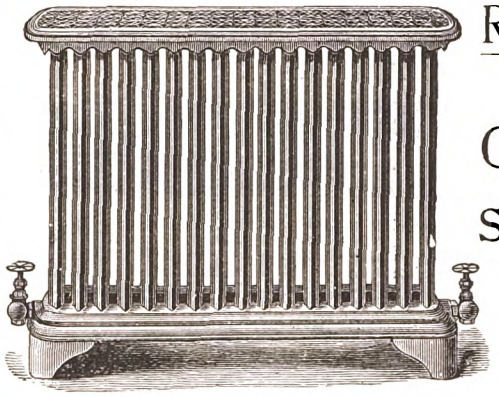

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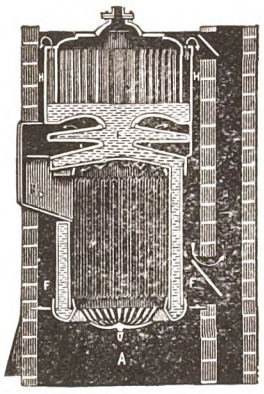

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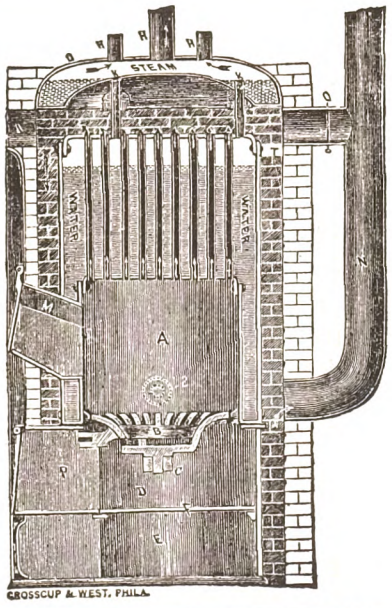

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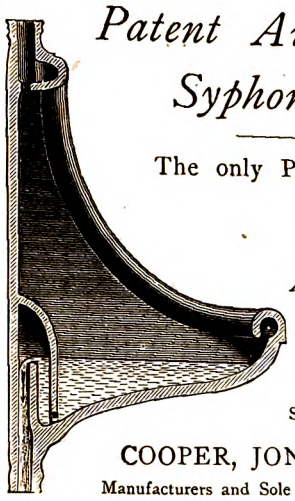

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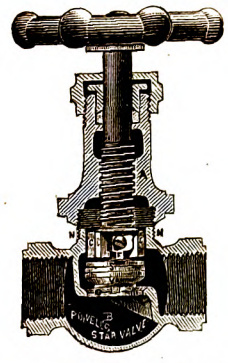

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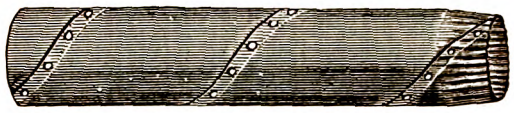

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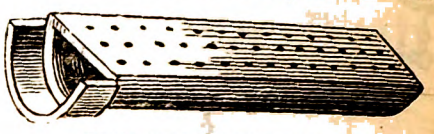

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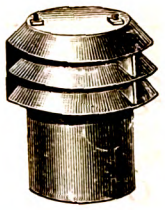

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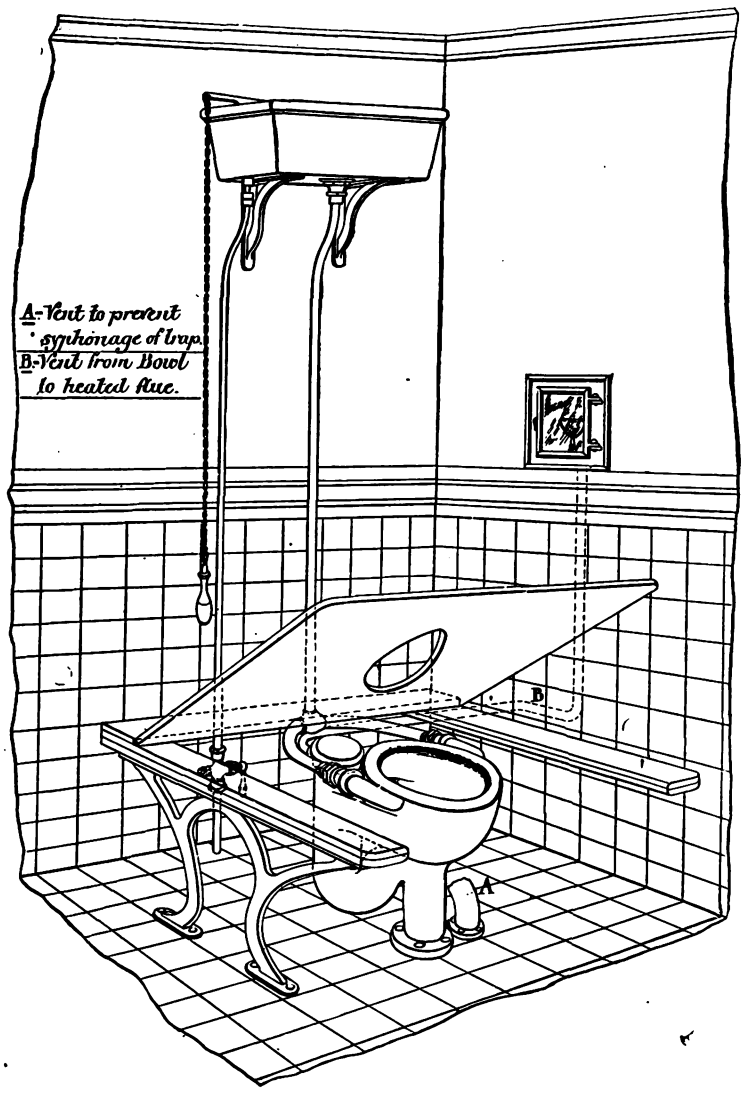

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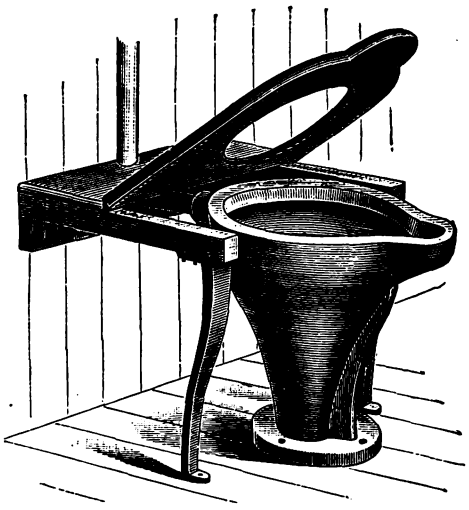

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ADULTERATION OF FOOD AND DRUGS.

The New York law for the prevention of the adulteration of food and drugs imposes on the State Board of Health the duty of making the necessary investigations and inquiries to ascertain that the law is obeyed, and of preparing rules and regulations for the collection and examination of samples. It is also the duty of the Board to prepare and publish, from time to time, lists of the articles, mixtures and compounds, which, by virtue of the authority conferred upon it by the act, it declares to be exempt from its provisions; and it is to fix the limits of variability permissible in any article of food, or drug, or compound, the standard of which is not established by any National Pharmacopœia.

This law was approved June 2, 1881. For the next eighteen months the Board confined its work to investigations as to what forms of adulteration were actually prevalent, and the best means of detecting them. It published no lists of exemptions and fixed no standards of permissive variability; and it received from manufacturers but few requests for such exemptions or standards. Probably the manufacturers thought that the act was a piece of sentimental legislation which would never be enforced, and that it would be unwise to oppose it, since to do so would be to call attention to themselves, and add force to the prevailing opinion that it is time to put a stop to the cheating of the public in this way.

But about a month ago the Board proceeded to prosecute certain retail dealers for selling adulterated cream of tartar, mustard, coffee, etc., and the prospect is that this is merely a commencement.

Under these circumstances manufacturers who are engaged in the profitable business of mixing ground gypsum with tartaric acid, burnt peas with ground coffee, etc., have raised a considerable amount of money, employed able lawyers, and are proceeding to contest, by every possible technicality, appeals to higher courts, etc., the operation of the law.

All this was to be expected. They must either find some means of evading the law, or go to some other State to carry on their business. They complain more especially of three things: First, that they had not sufficient notice of the intention of the Board to prosecute. Second, that the Board has not published lists of exemptions or standards. Third, that so long as manufacturers in other States have no check in their work of adulteration, the New York manufacturers will find their market practically confined to their own State, as they cannot furnish pure articles at the prices for which the adulterated articles are offered; and if they label their mixtures so as to show their composition, as required by law, it will greatly injure their sale.

The man who mixes 95 parts of ground gypsum with five parts of tartaric acid knows very well that no exemptions or standards which the Board could make would cover his case, and as to not having had warning—the law itself is the warning.

Their third reason is the true one. If this law is enforced, as we hope and believe it will be, the exports of adulterated foods and drugs from New York will greatly diminish, and for a short time there will be a corresponding increase of this trade at Baltimore, Philadelphia and other cities. Is it not then very unwise to drive capital and trade to other States? To which we reply most emphatically, No—it is not unwise as regards that capital and that trade which is employed in cheating the people.

There is an abundant market for pure food and drugs, provided, only, that some reliable assurance can be given that they are pure. Let the State of New York give this assurance and her commerce will not suffer.

We do not think that any State should be permitted to send into other States adulterated food or drugs. If the State chooses to allow the cheating and poisoning of its own citizens to go on without hindrance, outside parties have no right to interfere.

In the meantime, we urge our State Board of Health to push their work, for they may be sure of the support of the community. They have already commenced the publication of lists of exemptions and standards, and this should be continued as rapidly as possible.

Those manufacturers who wish to furnish pure goods and to have mixtures so labelled as to show distinctly what they are, should keep the Board of Health fully supplied with information upon these subjects, and so hold up their hands in this good work.

Let honest manufacturers also insist upon such legislation by Congress under its constitutional authority to "regulate commerce between the States" as will practically confine the adulterations of food and drugs within the limits of that State whose narrow policy permits them.

Finally, we suggest that those manufacturers who are engaged in making mixtures request of the State Board of Health such exemptions and standards of variability as they (the manufacturers) deem expedient and proper, and we believe they will find the Board ready and willing to do everything that is reasonable and right.

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THE CENTRAL SANITARY BUREAU OF ENGLAND.

The duties and powers of the Local Government Board of England are by no means generally understood in that country, and still less so here. Recently Sir Charles Dilke has been made the President of this Board in place of Mr. Dodson, and in an address to his constituents he has given a brief account of the duties of the office. It has to deal with all questions of local boards and towns improvement commissioners, and to approve all loans raised by local authorities under public health acts and local acts. It deals with proposals for making new sanitary districts and with the revision of by-laws of all local and sanitary authorities. It has to inquire into outbreaks of disease, and, if necessary, to put in force exceptional powers for the prevention of dangerous diseases, to advise on plans for hospitals, and to examine and report upon the reports of the medical officer of health for the city. The acts for the prevention of adulteration of food are carried out under its regulations. It has charge of the administration of the acts for prevention of the pollution of rivers and of the alkali acts, and of the registration of vital statistics. Besides all this, it has the poor laws to administer.

It is a board only in name—its president having much the same powers as, for example, our Secretary of the Interior.

For advice as to its sanitary recommendations it has a medical officer, Dr. Buchanan; an engineer, Mr. Rawlinson; and an architect, Mr. Smith; but the president has not heretofore placed any very heavy responsibility upon these officers, sometimes not consulting them, and sometimes disregarding their opinions. The great complaint made with regard to Mr. Dodson's administration is that its object seems to have been to do as little as possible. The *Lancet* remarks that "a fatal narcotism seems to fall on the brains of ministers who take office in this department." The *Medical Times and Gazette* says: "Mr. Dodson seemed to have regarded the post as one of rest, to have, therefore, determined on a policy of inaction. and to have carried out the same with remarkable pertinacity."

It certainly seems as if there were room for improvement in the organization and work of the sanitary branch of this bureau, and we believe that the medical officer would soon effect some important changes if allowed to do so by the president of the board. Let us hope that Sir Charles Dilke will not commence his work on the theory that he is personally omniscient and infallible and can decide engineering and sanitary questions without reference to the opinions of experts.

NEW YORK'S WATER SUPPLY.

No. III.

THE SUPPRESSION OF WASTE.

Glasgow is favored with what is now considered an abundant water supply, though this happy condition is due to the successful effort of Mr. Gale, the city engineer, to suppress waste. The practice is to require plumbing fittings to conform to a standard, set by the chief engineer, to have the plumbing of each house examined before water is turned on, and periodically thereafter.

Some years since, when Glasgow was threatened with a scarcity of water, increased powers and funds were allowed the chief engineer to secure the suppression of waste, and the results are stated at length in Stewart's paper on "Prevention of Waste of Water."

In certain localities, district meters were applied by way of experiment. These showed that it was possible to reduce an average consumption of 59.2 gallons (imperial) per head per twenty-four hours, to 26.6 gallons. The night rates which had been 45.0, were reduced to 10.8.

These gratifying results secured the extension of this system to forty-one sub-districts, and we quote the following, from the paper read by Thomas Stewart at the Institute of Civil Engineers:—

"A few of the more striking results are given here:

Number of District.	At Starting of Meters.		After the Three First Inspections.	
	Total.	Night rate per 24 hrs.	Total.	Night rate per 24 hrs.
	Gallons.	Gallons.	Gallons.	Gallons.
I.2	81.8	64.0	34.1	9.9
I.3	68.3	45.7	31.9	15.0
II.2	over 70.0	over 70.0	35.5	17.5
IV.2	41.6	27.4	27.4	8.3
IV.6	61.0	55.0	47.2	23.8

"In seventeen districts, at the starting of the meters, the consumption per head per twenty-four hours was 60 gallons or more; in eleven of these it was reduced by the first three inspections below 40 gallons. In twenty-five districts, at the starting of the meters, the night-rate per twenty-four hours exceeded 40 gallons; it was reduced below 20 gallons by the first three inspections.

"Appendix III. shows, that, at the starting of the meters, the average consumption, for all purposes, was 49 gallons per head per twenty-four hours, which was reduced to 32 gallons by the first three inspections; the corresponding night-rates were 37.7 and 17.5 gallons. The night-rates, however, are exaggerated, on account of the pressure being much higher at night than during the day. On the 6th of January, 1881, the consumption was 35.3 gallons, which shows a saving of 13.7 gallons per head, or, if the whole district under control be considered, the saving is 1,114,317 gallons per twenty-four hours, equal to 1.48 gallon per head of the whole population in the area of supply. If a saving of 13.7 gallons per head was made over the whole of Glasgow and district, containing 754,778 persons, the total saving would be 10,340,450 gallons per twenty-four hours.

"The operations showed, almost uniformly, that the quantity of water consumed increased during the nine weeks which elapsed between two inspections, and the most reliable observations gave an increase of 3.4 gallons per head, on an average. The total saving per head after the first three inspections were completed, was 17 gallons, so that if the consumption continued to increase at the rate of 3.4 gallons in nine weeks, the original rate of consumption would be reached in ten months and a half. In some of the districts the increase was at the rate of only 2 gallons in nine weeks; in others, it was at the rate of 7 gallons.

"An instance of the gradual increase in the rate of consumption may be referred to in sub-district IV. 3, when left without inspection for three months and a half. Before the night inspection, the consumption per head per twenty-four hours was 27.0 gallons, and the night-rate, 15.3 gallons. Fourteen days after the inspection had been made, the rates were 22.2 and 10.1 gallons; six weeks after the inspection the rates were 23.3 and 9.6 gallons; ten weeks after the inspection, the rates were 26.5 and 12.6 gallons; and fourteen weeks after, they had increased to 28.0 and 14.9 gallons."

It will be noticed that the application of district metres was not general in Glasgow, though the results obtained by their partial use no doubt secured for the chief engineer the authority and means to enforce a rigid house-to-house inspection, and to control the character of new fittings, though, as a matter of fact, more latitude is allowed in the trial of new taps and devices in Glasgow than in Manchester, Liverpool, and some other places. As may be supposed, manufacturers and inventors are constantly submitting new or alleged new devices for the approval of the engineer, claiming, as a matter of course, that they are superior to anything hitherto in use. Many are rejected on sight, others that hold out a prospect of success the engineer disposes of by consenting to allow them to be used in a certain house or row of houses if the builder requests it. A record is kept of such cases and their operation is watched for a year. As a general thing few articles survive this test, even of those that are subjected to it, and the authorities find it an easier way of disposing of sanguine inventors than to absolutely refuse to try their wares.

[To be Continued.]

We print on another page a letter from Mr. John Worthington, a member of a plumbers committee to prepare a plumbing ordnance. This letter is especially intended for the plumbers of Philadelphia, yet the sentiments expressed in it should be those entertained by plumbers everywhere. Popular ignorance in the past has fostered a want of appreciation of the plumber's calling, and has made it possible for men of no skill, little knowledge. and less principle to engage in this business. The public have encouraged them, and discouraged honest and capable competitors, because a low price was the only consideration that secured employment. Happily, a change has come in some quarters and is appearing in others. It can be hastened everywhere, if the suggestions conveyed in Mr. Worthington's letter are acted on in plumbers' associations and by plumbers as individuals. As associations, they must not admit, or retain as members, men known to do "skin" work, and when the prevailing sentiment in a plumbers' organization will secure the expulsion of men convicted of doing dangerous work, and swindling an employer, then, and not till then, will these organizations be able to exert the influence that such associations should possess in order to have a reason for an existence.

When the new Board of Health, of Paterson, N. J., entered on its work a few months ago, one of the local papers spoke of it as an indication that Paterson was going to be a well-governed city. At any rate the Board have done well in issuing, within a few days, a circular recommending a system of plumbing, which is substantially the same as that enforced in this city. We regret that we cannot find in the ordinance creating the Board, nor in the circular, that they have any powers in the matter beyond recommending, but, however that may be, they have certainly done a wise act in using the weight of their official position to induce their fellow citizens to adopt proper plumbing in their houses.

Senator Adams has introduced in the Legislature of the State of Pennsylvania a bill "to establish a State Board of Health for the better protection of life and health, and to prevent the spread of contagious and infectious diseases in this commonwealth."

It provides for the appointment of six persons, a majority of whom shall be physicians of good standing, graduates of regularly chartered and legally constituted medical colleges, and of not less than ten years experience in the practice of their profession, and one of whom shall be a civil engineer, who, together with a secretary to be chosen by these six appointees, shall constitute the State Board of Health and vital statistics of Pennsylvania. This Board is to have the general supervision of the State system of registration of vital statistics and of the registration of physicians, and is to recommend such legislation as it finds necessary in this connection. The salary of the secretary, who is the executive officer, and the only member of the Board who receives pay, is fixed at two thousand dollars.

This is too little to secure the kind of man that is wanted. If he can't, or won't do a good three thousand dollars' worth of work it is much cheaper to have some one who will. The bill is a very good one, and avoids the error of prescribing in detail work which is yet to be organized. It is time that the State of Pennsylvania provided such an organization and most assuredly the money needed to support it will be well and wisely spent.

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LETTERS TO A YOUNG ARCHITECT
ON
VENTILATION AND HEATING.

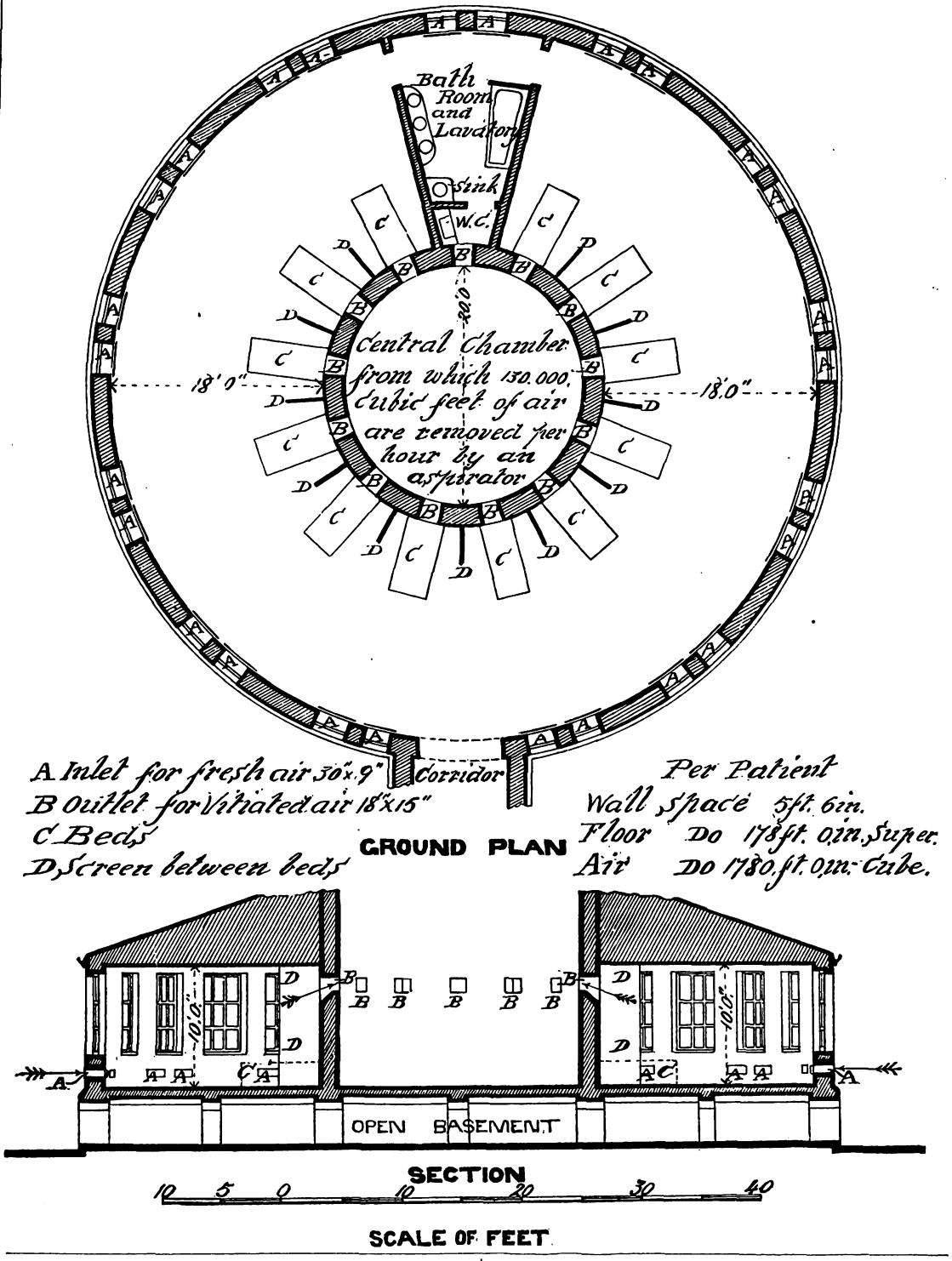
BY JOHN S. BILLINGS, SURGEON, U.S.A.

No. XLIII.

In my last letter reference was made to small hospitals for contagious diseases as being usually simple and cheap. Within the last year, however, it has been suggested that more elaborate arrangements may be necessary in the case of those small-pox hospitals, which are to be located in large cities with comparatively thickly settled suburbs. In the report presented last year by the Royal Commission appointed to inquire respecting small-pox and fever hospitals, the conclusion is arrived at, expressed, however, with some doubt and hesitation, that small-pox hospitals may diffuse infection around them through the atmosphere, independent of any conveyance of the contagion by persons or things going from the hospital, or of the transportation of patients to it. This conclusion is based mainly on the investigation made by Mr. Power as to the diffusion of small-pox from Fulham Hospital, and as the result the Commission state that in the present state of our knowledge it is essential that in the construction and management of small-pox hospitals both atmospheric dissemination and personal communication should be, with the utmost care, guarded against. To prevent the atmospheric dissemination the Commission recommend that not more than 30 or 40 small-pox patients should be placed together in one locality, and that the separate small-pox buildings should be so constructed as to reduce within the smallest limits the chance of spreading infection. They say, "We fully believe that contrivances for this purpose might be devised, and we again call special attention to the evidence on this point which has been furnished to us by Dr. Burdon Sanderson."

Turning now to the evidence of Dr. Burdon Sanderson, who is one of the most distinguished scientific men in London, and whose advice in such a matter is entitled to the greatest respect, even if it were not endorsed as it is by the Commission; we find that he proposes to so construct the small-pox ward that all the air in it which has come in contact with the patients, can be subjected to a high temperature to destroy its dangerous properties. He says: "As the outlets of air are the sources of danger and not the inlets, it is preferable that the air should be drawn out of the hospital, and not driven into it, and, consequently, we should choose a mode of ventilation accordingly, and that being adopted, the beds for the patients should be placed as near the outlets for air as possible; and further, the outlets themselves should be as near together as possible. The communication between the outlets and the source of motion, whatever its nature might be, should be as direct and ample as possible. Considering all these purposes, it is desirable that each ward should be in the form of a ring, with the chamber from which the air is directly extracted in the centre of the ring, the annular being the simplest form that can be given to it; that is to say, the one that makes it possible to make the opening for extraction of air communicate more directly than any other with the space in which each bed is contained. Then for a ward of 12 beds, having a capacity of about 1,200 cubic feet per bed, the removal of air should be about 120,000 cubic feet per hour, and, consequently, the removal of air per patient 10,000 cubic feet per hour. * * *

"The beds would be arranged as near as possible to, and immediately below each extracting opening, and would be placed against the internal wall, and each bed would be placed between two of the septa or screens which pass to a certain distance out from the internal wall into the annular space, so that the head of each bed would be included in the space between each two neighboring septa. The space within the ring communicates with the annular space which



answers the purpose of the ward, by extracting openings, and also with an extractor, preferably a fan. An extracting shaft might, of course, be substituted for the fan; but I think a fan preferable on the ground that its action is more independent of temperature and wind, and therefore more constant, and that it is more economical. The fan would collect the air from the ward and at once discharge it into a chamber, where it could be subjected to a higher temperature, so as to destroy all organic matter it might contain."

The windows are not to open. Twenty-four openings for fresh air are to be made in the external wall, each having two square feet of area. The movement of air through the outlet openings is intended to be at the rate of one mile per hour, allowing 10,000 cubic feet of air for each patient, and to secure this slow movement and thus to prevent draughts, the outlet openings are also to be two feet square. The method of warming proposed is to carry around hot water pipes in front of the inlet openings. From the fan the air is to pass to a gas furnace, probably in the roof of the house.

From this description and the accompanying plans, of which copies are appended, it is evident that while it is theoretically possible to thus disinfect all the air passing through a small-pox ward, it would be at a relatively great expense. The circular ward is used in the new City Hospital at Antwerp, and the same principle is employed in the Octagon Ward of the Johns Hopkins Hospital, at Baltimore; but in both these the beds are arranged against the outer wall, having the heads towards the windows, which is a much more convenient way of arranging them than the plan proposed by Dr. Sanderson, both because it allows more space about each bed and because it does not put the patients facing the light, which would be extremely unpleasant in the acute stage of small-pox.

A second objection is that the central shaft is unnecessarily large, as are also the inlets into it. It is not desirable to reduce the velocity of the air at the outlets or in foul air ducts below four or five feet per second, because at very low velocities a very slight thing will disturb the currents. The velocity at the outlet has comparatively little to do with the production of draughts. There seems to be no necessity whatever for the use of an aspirating fan in the plan proposed. If the air is to be heated to a temperature of 250° F. and upwards, which is necessary to secure its disinfection, this heat will in itself furnish all the aspirating power required. The use of gas to produce the heat required for such large quantities of air would also be unnecessarily expensive; a coal furnace would do the same work at half the cost.

In the plan proposed, in cold weather, a large amount of the incoming fresh air, and the heat

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employed in warming it, would be wasted, since it would rise rapidly from the point of entrance, taking almost a direct line to the point of exit, and passing above the beds, the occupants of which thus get no benefit from the main stream of fresh air, but must rely on what comes to them from a sort of eddy and from diffusion. It would have been much better to introduce the greater part of the air through a grating beneath and between the beds, in which case the patients could be kept bathed in a steadily ascending stream of air, moving at the rate of say four miles per second; and this would be effected with less than half the amount of air and expenditure of fuel required in the proposed plan. It should be remembered that in a hospital of this kind, where special arrangements are to be made to secure a steady, uninterrupted stream of air through the ward, the allowance of floor space and cubic air space per patient become of secondary importance, so far as ventilation is concerned, and may be fixed mainly by considerations of convenience of administration. This ward might be made ten feet less in diameter and the central shaft reduced to four feet in diameter, with good effect.

These suggestions are made, not for the purpose of fault-finding, but because everything which comes from such distinguished authority, should be made as perfect as possible.

It seems probable, however, that the neighborhood would be more certainly and economically protected by the continuous enforcement of vaccination, than it would be by any particular form of hospital.

[To be Continued.]

HYGIENE OF THE DWELLING.

Mr. James C. Bayles, editor of the *Iron Age*, lectured before the Newark City Council of Royal Arcanum, recently, on "Hygiene of the Dwelling." Safe and comfortable houses were, he thought, rare. There were those who had come to believe a house could not be provided with "modern conveniences" and be safe to live in; who thought the only safe houses were those built in the primitive style. He did not think so, however, but maintained that good plumbing and careful arrangements would make a building quite safe. He believed nearly every house should be provided with two vertical soil pipes, one at the rear and another about one-third from the front wall of the building back, or near the centre, in order that shorter connections might be made therewith, and the custom of piping long distances under floors to a rear soil pipe, avoided. It also afforded less opportunity for plumbers' errors and carpenters concealing them. Every connection with soil pipes should be independent and as short as possible, so that the emptying of one basin would not disturb the contents of any other. These vertical pipes should extend above the roof, and he favored no crown or cap—a simple open end. Every trap should be ventilated. He knew cunning devices might be constructed to avoid the necessity for ventilation, but they involved too much risk; perfect plumbing must be done, it must be a nice working contrivance, and all accidents must be avoided.

A source of much evil might be found in the nooks and corners and cubby-holes frequently left by the builder for convenience. These become the receptacles of old shoes, rolls of rags, etc., all of which were better in the ash barrel. The cellar is an important apartment. It must be kept clean and dry. The first sign of mould should be looked upon with alarm, and he preferred decaying animal matter to decaying vegetation. A bin of rotting potatoes was worse than a dead cat. It should have light and ventilation.

The heating of a dwelling has a great hygienic influence. He preferred the hot-air furnace. A large furnace, that would not have to be overworked, or two, of different sizes for different seasons, pumping air at a temperature of not more than 100° F., with rooms so venti ated that it could find egress as fast as it was forced in, would be about the thing, always provided the furnace was fed from a pure source. Letting in foul air from the cellar, or that obtained under porticos, or often on a ground level through channels never cleaned, were bad arragements. Air which in the first instance is fit for the lungs only should be used. Sound pipes and good joints will avoid coal gas and other troubles proceeding from the hot air furnace, and rooms thus warmed will never want for fresh air when it exercises a force of fifteen pounds to the square inch on every crevice, It cannot be kept out. For ventilation he liked the open fire-place.

PROTECTING PIPES FROM FREEZING.

So much damage was caused to plumbing in Edinburgh by the the freezing of pipes during the severe weather two years ago that the Sanitary Protective Association of that city bethought themselves to issue a pamphlet on how to protect pipe and fixtures from freezing. Some of their directions, of course, apply to English and Scotch plumbing rather than to ours, but most are equally good tor this country.

Their first recommendation is that good fires should be kept up, even in unused rooms, so as to warm the house thoroughly.

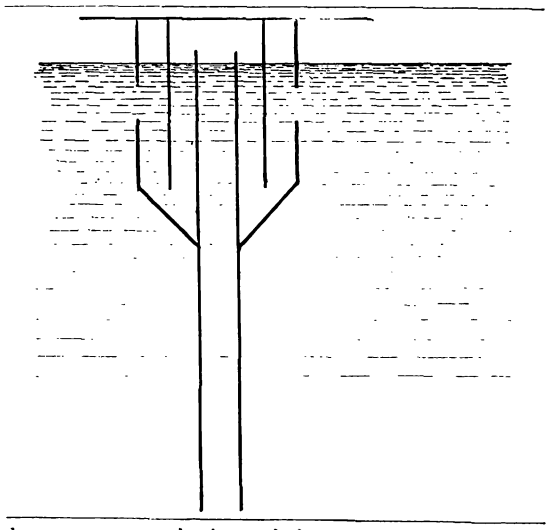
"In apartments where there is no fire place the gas may be kept burning, or a gas or paraffin stove may be used. It must be remembered that water piping often passes through rooms in which its presence is not suspected.

"Direct communication between the outer air and apartments or spaces containing piping, whether through windows or other ventilating openings, should be avoided by having such openings temporarily closed.

"Water should not, intentionally or through defective repair of the water fittings, be permitted to trickle at any water closet, sink, bath, or basin connected with an outside or exposed soil-pipe, since, apart from the enormous waste of water which this course involves, it is very likely to result in the freezing up of the soil pipe.

"Water which has to remain stationary for any length of time in the water closet, bath, sink or basin traps, may be rendered less likely to freeze by the addition of a quantity of salt. A handful of coarse salt may with advantage be thrown down a water closet each time it is used.

"Exposed portions of piping should be emptied of water during the night. To empty the main water supply pipe, which is that establishing communication between



the water company's pipe and the various cisterns in the house—(*a*) the stop-cock controlling the entrance of water into it should be shut; (*b*) the draw off tap placed upon the house side of that stop-cock should be opened and left open; and (*c*) a little water should be drawn out of each cistern in the house. To empty pipes which distribute water from the cisterns, it is necessary—(*a*) to prevent the water in the cisterns entering the pipe to be emptied; this is usually effected by means of a drop-valve let fall into the mouth of the pipe; (*b*) to admit air just under the valve, the usual means of securing this being an air-pipe taken from the under side of the drop valve, and carried above the cistern water level; and (*c*) to open the taps connected with the pipe.

"The kitchen fire should be drawn if water cannot be obtained at the hot water taps connected with a pressure boiler.

"Before the winter is fairly begun, all stop-cocks or valves controlling the water supply should be examined to ascertain that they are easily accessible, and that they are in working order."

With respect to the position of pipes and fixtures the following points should be attended to:

"When possible, pipes run in very exposed positions should be shifted.

"Pipes which cannot so be shifted should, as far as possible be protected from direct air currents, and should be jacketted with some porous material, such as saw-dust, hairfelt, or plaster of Paris, and kept thoroughly dry.

"Pipes run underground in this neighborhood (Edinburgh) should be placed at least two feet six inches beneath the surface.

"Chases containing piping should be built across at intervals, so as to prevent currents of cold air blowing up or down them.

"Safe tray waste pipes which are carried direct to the open air should be protected by hinged flap valves hung upon their mouths.

"Cistern overflow pipes which pass direct to the open air should be trapped by means of self-filling traps, as in the annexed sketch.

"A layer of roof felting may be placed between the sarking and the slates.

"The wallheads may be beamfilled, but only in the immediate vicinity of piping, or, where necessary, to protect it from direct air currents.

"Where rain-water has to be conveyed from a centre gutter to either front or back slopes of a roof, this should be done by means of a closed pipe, and not by means of an open gutter.

"Exposed positions under cisterns or in which piping is placed, and which lie close to a fire-place and chimney, may be heated by the circulation of hot water from a boiler heated by a Bunsen burner. The products of combustion should be passed up the chimney.

"Small hot-water coils connected with existing hot-water piping will often give sufficient heat to prevent a cistern becoming frozen.

"Cisterns should be placed in properly constructed spaces, from which it is possible to exclude cold currents of air.

"Various devices have been proposed by which it is supposed that pipes might be prevented from bursting even when the water inside them freezes. None of these inventions have so far been practically successful. Probably that based on the principle that a pipe with a circular section has a larger capacity than one with a flattened or oval section, is the most ingenious, and most likely to be successful.

"Leaden pipes outside the house may be thawed by lighting a fire of paper or shavings close to them, or by throwing hot water upon them. Leaden pipes inside the house may be thawed by laying cloths dipped in hot water upon them, but unless it is certain that the means of shutting the water out of the frozen pipe is in order, it is better to have competent assistence in thrawing the pipes.

"Water closet basins, iron waste pipes, etc., should not be thawed by throwing hot water over them, as they are very liable to crack."

THE CESSPOOL NUISANCE.

We store up the wastes in these horrid receptacles all about our premises, and even under our houses. There are premises in Trenton full of these glutted reservoirs of foulness, with no room for any more. Fancy the effects of living in the centre of such a cluster of accummulations of filth! The house connections with these cesspools are often without traps, and the deadly gas they generate pervades the home. They cannot fail to pour their reekings into the air through the earth and other outlets. They pollute the air we breathe. The New York State Board of Health has officially declared: "That the use of privy-vaults, privy pits, and cesspools, is seriously affecting the public health;" and further, "that all excreta should be removed from the neighborhood of human dwellings, instead, of being stored up near them in pits, vaults or pools, to poison the water, earth, and air." In some European cities the abandonment of the old cesspool system has already been accomplished, and in others the measure is being seriously contemplated. Dr. E. Vallin, Professor of Hygiene at Val de Grace, says that every one is agreed, at least in principle, upon one point, namely, that permanent cesspools, as forming a structural portion of dwelling-houses, should be superseded.—*Trenton State Gazette.*

In making the excavations for the new sewer at the Brooklyn Navy Yard the workmen are unearthing human bones and skulls near the Long Wharf. The wharf is built upon the beach where were buried those who died during the Revolution on board the English prison-ships that were anchored off the Wallabout. Six barrels of the bones of these Revolutionary ship-martyrs have been dug up since January 3, when the work began.—*Chicago*

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Feb. 3.....	24.47	18.53	21.15	27.47	29.29	19.35

E. G. LOVE, Ph.D., *Gas Examiner.*

DANGEROUS ILLUMINATING OILS.

The first indictment under the new law of this State (passed June 6, 1882, the full text of which may be found in THE SANITARY ENGINEER of June 15, Vol. VI, page 52), prohibiting the sale of illuminating oils which emit an inflammable vapor at a temperature below 100° F., was granted, on the 1st inst., by a grand jury at Utica, on complaint of State Board of Health Inspector Colby. The indictment is against Messrs. A. Ethridge & Co., wholesale dealers of Rome. The character of the oil sold by them became known to the Board through an accident which occurred at Herkimer, on the evening of Nov. 27, 1882, when Mrs. Peter J. Casler was fatally burned by the flames of oil which had been spilled on her clothing from a broken lamp, and her husband also severly burned in attempting to extinguish the flames. Inspector Colby at once made examination and found the vapor flashing point of the oil in the can from which the lamp had been filled was but 93° F. An independent examination of the oil sold by the retail grocers, Messrs. Parkes & Barry, of Herkimer, of whom the Casler family had purchased their oil, showed the same flashing point. The barrel from which it was taken was branded with the name of Ethridge and Co., of Rome, and also "N. Y. State Legal Test."

The Inspector also brought cases at the same court against three firms of retail grocers in Rome, of which he had purchased samples of oil on Oct. 13, 1882, viz.: Messrs. J. H. & J. Williams, Messrs. Brigge & Clark, and Messrs. T. J. O'Connell & Co. His examination showed the flashing points of these samples to be 81°, 81° and 79° F., respectively. Indictments were found in these cases also. Arrangements will be made for as early a trial as possible.

LONDON GAS SUPPLY.

A man who makes his own gas, writes to the London *Times*, complaining of the London gas supply. He says, the semi-transparent globes are coated within a few hours with a "brown residuum," and exclaims, "how destructive to health the gas must be, and how much sulphuretted hydrogen passes into the lungs of those obliged to breath it."

He considers that gas is free from impurity, if it does not discolor lead paper within ten seconds. This is the test which he applies to his own gas.

It would appear natural that a man who made his own gas, might be supposed to know a little something about the subject, but such is not always the case, it seems.

The Gas Referrees require that the London gas shall be entirely free from sulphuretted hydrogen, and, as a penalty is fixed for violation of this, and, as the gas is tested daily by the examiners, it does not appear probable that this substance would be found except at rare intervals.

Sulphuretted hydrogen is a combustible gas, and even though it were present, it would be converted in the burning of the gas, into sulphurous oxide, the same as other sulphur compounds. It is not the cause of the formation of the "brown residuum."

Moreover, sulphuretted hydrogen may exist in gas and its presence not be detected by a ten-seconds' exposure to lead paper. We know of a gas supply in which the "total sulphur" seldom exceeds ten grains in 100 cubic feet, and which, nevertheless, shows the presence of sulphuretted hydrogen almost constantly. This impurity, therefore, is not to be taken as indicating the purity of a gas supply, even with reference to the sulphur compounds.

The letter in question is headed "Gas *vs.* Electricity," and its writer, in closing, asks that his test be applied, and then let anyone "judge for himself whether gas or electricity is least injurious to health."

It is unfortunate that the press is so often used to give expression to erroneous and ridiculous notions, without a word of comment or criticism.

ELECTRIC LIGHT NOTES.

An electric light company, with a capital of $150,000, has been organized in Hoboken.

The Dublin Electric Light Company which was formed in June, 1881, with a capital of about $750,000, has been wound up, and its plant will be sold.

It has been decided to hold an International Electric Exhibition in Vienna, to be opened on the 1st of August next and to close on the 31st of October.

The electric engineer, appointed by the Sheffield, Eng., Corporation, has reported against adopting electricity for street lighting.

The Hartford, Ct., *Courant* says that the American Electric and Illuminating Company will be maintaining between 500 and 600 lights in Boston within 60 days.

The Thomson-Houston Electric Light Company are lighting a few business houses on Market street, Philadelphia, using underground wires. The conductors are made of heavy copper wires, encased in cotton saturated in wax and then covered by a close-fitting lead pipe.

"The Sperry Electric Light Motor and Car Brake Company" of Chicago has recently been organized, claiming to have a capital of $1,000,000, to push the inventions of Mr. Elmer A. Sperry in electric lighting and the application of electricity in motors.

The Committee on Ferries and Franchises of the Aldermen of this city, have presented to the Board a report on the petition of the New York Electric Lines Company for permission to lay electric wires under the streets. They recommend that the petition of the company should be granted, its operations, however, to be subject to the provisions of the ordinance regulating the laying of underground wires.

The new ordinance regulating the laying of underground conduits for electrical purposes which is now before Philadelphia Councils, provides that authority must be obtained by ordinance before any street shall be broken for the purpose of laying conduits, etc., and that no street shall be opened for a greater distanee than 500 feet at any one time, the width of such opening not exceeding 2 feet. The ordinance further provides that parties laying con duits shall be responsible for damages to gas and water mains, and sewers. The city is given the privilege of using or occupying three of the wires or conductors of any company for any municipal purpose free of cost, provided thirty days' notice is given. The ordinance provides the following charges: For overground electric lighting wires, an annual payment of $5 per mile; for overground telegraph or telephone wires, $2 50 per mile; for electric lighting wires laid under ground, $2 50 per mile, and for telegraph or telephone wires under ground, $1 per mile.

Meter-ites.

A bill introduced in the California Legislature makes it a crime for any hotel keeper to neglect to hang upon every gas fixture printed directions about turning off, and a warning not to blow out the gas.

A bill was introduced by a Mr. Curtis, in the Illinois Legislature, the 27th ult., to provide for the inspection of illuminating oils. It authorizes the Governor to appoint a State inspector of oils, and adopts the Michigan tester.

Bids received for lighting Columbus, O., made the cost, if the 1,000 lamps were lighted by gas and 462 by naphtha, $25,804. If all were lighted by naphtha, $22,621. The contract was awarded, for all the lamps, to the naphtha company.

Astoria, L. I., is supplied in part with naptha gas made by Magnus Gross' process, and furnished by the Excelsior Gas Light Company at $1 50 to $1 75 per 1,000 cubic feet. The gas is said to be 23 and 24 candle power. The present consumption is about 20,000 cubic feet daily.

An explosion took place the 29 ult., in the purifying room of the Lansing, Mich., Gas Works, demolishing a a part of the roof and throwing down a portion of the walls. It is supposed that there was some leakage in the purifier, and by some means it came in contact with flame.

The ordinance passed Jan. 23 by the New Orleans Council, granting to the Louisiana Light and Heat Producing and Manufacturing Company the right to erect gas works for manufacturing naphtha gas, forbids the company to discharge refuse of any kind into the Mississippi River, or to keep a supply of naphtha for more than one day's use.

Mr. Charles W. Hinman, State Gas Inspector, has presented his annual report to the Legislature of Massachusetts, from which it appears that 7,766 meters were inspected in 1882, and 127 about which there were complaints brought to the Inspector's office. Forty-one of these latter were found to be fast, the average being .04+; 62 were within the legal limit of two per cent, averaging .026 fast; 21 were slow, averaging .113; three would not register. The average of the 124 which registered was .0043 slow. The average for eleven years was .0065 fast. These were all dry meters. During 1882 were made about 450 inspections of gas, showing the following average candle powers. English candles made expressly for the purpose were used in testing. Boston, 19,13; Fall River, 16.55; Holyoke, 17.43; Lowell, 17.67; Springfield, 17.22; Worcester, 16.22. Only six places in the State rank higher than Boston. These are Southbridge, 22; Great Barrington, 27.1; Amesbury, 27.3; Leominster, 28.8; Lexington, 30.2, and Chicopee Falls, 40.4.

STARTING COAL FIRES.

Mr. Ernest Hart, Chairman of the Committee of Council of the Smoke Abatement Institute, writes to the London *Times*, giving directions to English people about burning anthracite coal. A few of them may be useful to American housekeepers.

The coal should be put on the fire lightly in pieces about egg size. Fires should be replenished with moderate quantities and before they get too low.

The coal should never be stirred with the poker. The ashes from the bottom of the fire should be gently raked out; the coal requires as much air as possible.

For kitchen use, no saucepan or kettle should be put to rest on the fire; they should be rested just above the fire, as the coal will not bear weight.

Grates or stoves with fire-clay sides and back are best adapted for burning coal, but it will burn in ordinary iron grates with attention to the above rules.

The cinders of the coal can be used, and make a bright fire if they are sifted quite free from ashes. The cinders are particularly useful in lighting fires.

To light a fire readily a good quantity of wood is required; a little of the ordinary description of coal (soft coal) to start the fire is useful. A red hot iron or "salamander" taken from one fire and inserted under the wood of another kindles it very readily.

A new steam car for street railways, manufactured by Kitson & Co., of Leeds, has made a successful trial trip at Birmingham, England. Its average speed was eight miles an hour, and it was started and stopped with ease, and did not frighten horses.

The city of Birmingham, England, has taken proceedings to compel certain towns above it on the River Thames to refrain from polluting the river. A scheme has been prepared by the local authorities of Wednesbury to unite four districts in South Staffordshire in one sewerage system and to purify the sewage. The estimated cost of the project is $350,000.

Mr. Neujeuen, of Liege, proposes to purify sewage by passing it through the basic slags of the Bessemer process, and has formed a company to work his patent.

Citizens of Dalhousie, Can., who have been annoyed by odors from the gas works, have determined to take legal proceedings to ascertain the liability of the gas company.

Dr. Edwin M. Snow, Health Officer of Providence, R. I., submitted to the Board of Aldermen, the 30th ult, a recommendation that quarantine be maintained against vessels from Baltimore, on account of the prevalence there of small-pox. The Aldermen passed a resolution to carry the recommendation into effect.

A water back explosion of extraordinary violence occurred not long ago in Montreal, apparently due to stoppage of the water back connections. For some days before the accident there being no water to be had, range men were sent for who put it in what was supposed to be good condition. The explosion took place soon after the fire had been started for breakfast. The range was shattered, a piece of iron driven through a zinc partition between the kitchen and the dining-room. The servant who escaped alive explained that "she was going from the stove to the water-tap when the place seemed all a kind o' 'luminated like, and a piece of something gave her a puck on the shoulder and made her spin round."

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BOILER CIRCULATIONS.

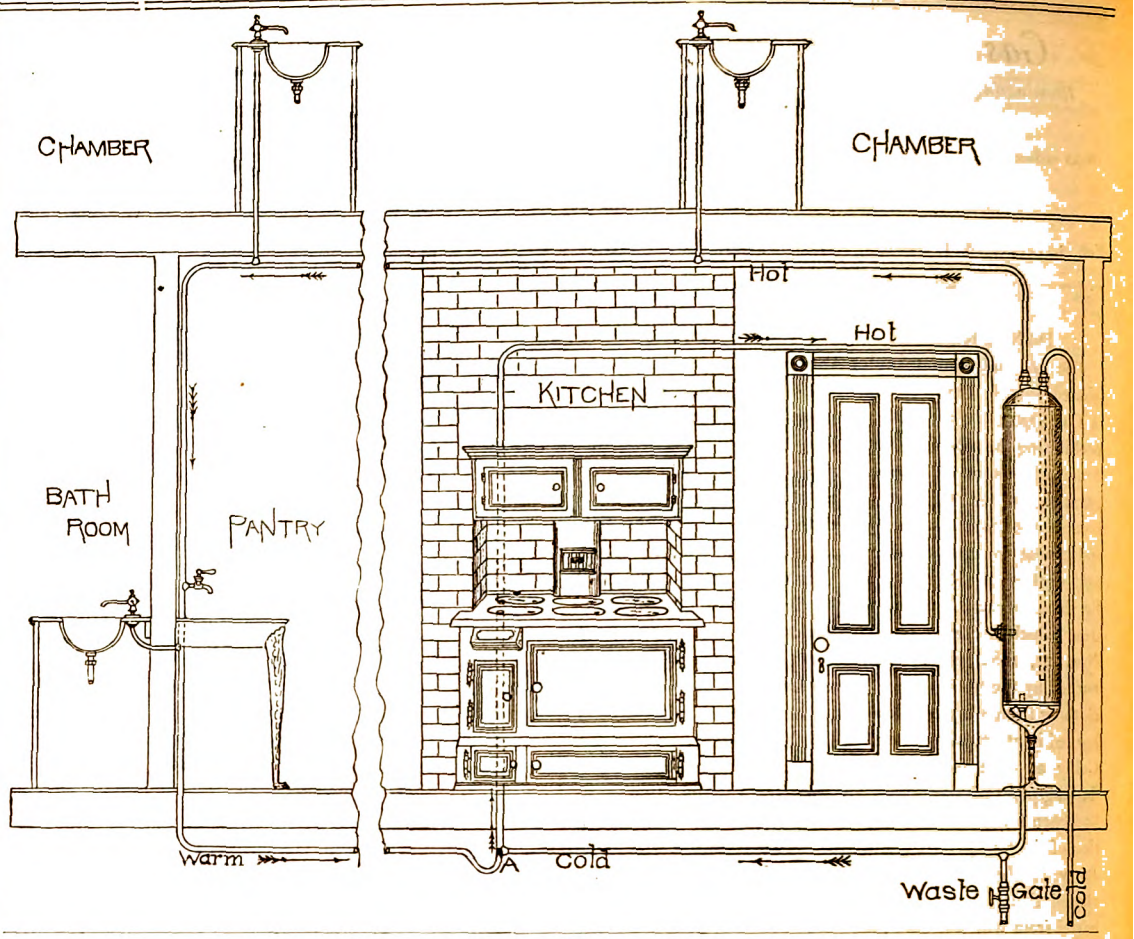
ST. JOHNSBURY, VT., *Jan.* 25, 1883.

To the Editor of THE SANITARY ENGINEER:

In Vol. 5, No. 6, dated Jan. 5, 1882, I find an article from S. L. B., Boston, Dec. 10, 1881, in regard to "Taking Return Below Boiler," in which the writer thinks it is an impossibility to do so, on account of getting a trap where the pipe rises, etc. When I had my boiler set, in connection with kitchen range, for various reasons I had it placed in my side hall, which opens into the kitchen. On account of length of pipe (some 40 feet) from boiler to pantry, and bath-room, it was necessary to draw a great quantity of water before we could get it hot. In reading the article referred to above, I came to the conclusion that it was worth trying to get the circulation, and I had the same arranged as per accompanying diagram, and am very happy to say, that it works to a charm, the circulation pipe from the pantry down into the cellar and up into the water front, being at all times warm. In making the connection in the cellar, marked *A*, with circulation pipe and lower water-front pipe, I took the precaution to make a check valve, by simply burring out the top of the soldering nipple, where the lead pipe connects with the iron pipe, and placing a common marble on top. Perhaps this is unnecessary, but I thought it would be well enough to take that precaution. You will notice a peculiar thing in the arrangement of taking the hot water pipe from the top of water-front, and carrying it over the door and then down into the boiler. It takes some time to get the circulation started, when I first start the fire and everything is cold; but once to going it works finely. In placing the boiler in the side hall I find that the radiation of heat from same keeps the hall comfortably warm during our coldest weather (thermometer stands at 30° below zero this morning). I have an idea in practical use, of heating a conservatory by hot water through contact of 1¼-inch iron pipes and outside of fire pot, of a Boynton hot air furnace. It works nicely, and is pronounced by florists to be the best thing of the kind known. If you should see fit to notice this in your paper, please send me a copy, and oblige,

Very truly yours,

CHARLES S. HASTINGS,
Paymaster, St. J. & L. C. R. R.



NUMBER OF WATER CLOSETS REQUIRED.

To the Editor of THE SANITARY ENGINEER:

In putting in water closets for a large factory in an eastern city, employing in one large building perhaps 300 hands, about one-half of whom are women, the question arose how many water closets would be needed. Will you please inform me whether sanitary engineers have adopted any ratio for such or similar cases? I have thought that perhaps your city Board of Health may have considered the question in connection with your densely populated tenement houses, and if so, would like to know their regulations in the matter. Also, whether under such circumstances, as all the closets will be on one soil pipe, *i. e.*, arranged directly over one another in a shaft or annex, and will be flushed with two gallon flushes from cisterns—a 5-inch drain pipe, iron, running some distance with a fall of one in forty will be sufficient to take care of the wastes and occasional foreign bodies thrown in by carelessness, without risk of obstruction? An answer will oblige,

Yours very truly, BUILDER.

[We think you would require at least 10 water closets—five for each sex. The pipe proposed is large enough. It should be provided with hand hole screws to admit of the removal of obstructions. You do not state how many operatives will be employed on each floor. Our rule would be to provide one closet for each 30 operatives on a floor.]

WHO SHALL PAY?

To the Editor of THE SANITARY ENGINEER:

My firm occupy the basement story of a large commercial building at a high rental. Our landlord is close, not to use a stronger phrase. Our plumbing was wretchedly bad, and we overhauled it entirely at a cost of several thousand dollars at our own expense, carrying a 4-inch vent six stories to the roof. This was a year ago. Now, the owners have decided to add two stories to the building and the question arises who is to pay for extending our air pipe the thirty additional feet? Must we do it or the landlord? BEACON STREET.

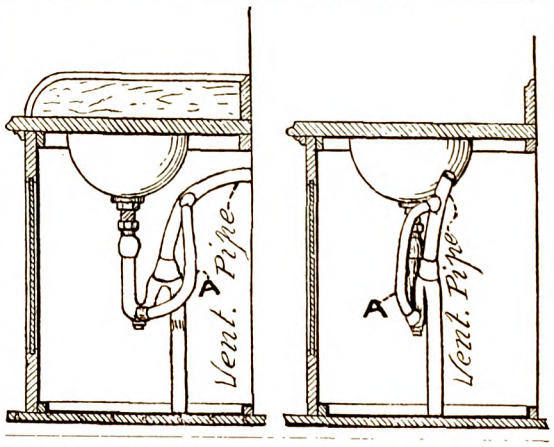
[If your Board of Health requires the pipe to go above roof, and it now does so, and subsequently another party adds stories to the building, we should say that he must make good any violation of the law or of your rights—assuming of course there is no special agreement between you affecting this question.]

TO PREVENT LOSS OF SEAL BY MOMENTUM.

AUBURN, N. Y., *Feb.* 1, 1882.

To the Editor of THE SANITARY ENGINEER:

It has been shown that a large amount of water poured into an ordinary S-trap, may, by mere momentum, destroy its seal. It has been observed, further, that when traps are ventilated sufficient water is sometimes forced up the ventilating pipe to restore the seal by falling back again into the trap. I enclose a sketch of an appliance intended to take advantage of this fact, and thus preserve the seal



from destruction by *momentum*. When the discharge occurs, water will (I should think, for I have not had time or apparatus for experimenting) rush up the "diverticulum A in sufficient quantity to seal the trap when the discharge is accomplished.

A CONSTANT READER OF YOUR JOURNAL.

[We do not think the benefit to be gained would compensate for the expense and possible complication arising from the presence of this extra pipe. Under a wash basin the risk alluded to is slight, and the branch pipe would in time be stopped up with filth, and be of little practical use.

FRESH AIR INLETS.

NEW YORK, *Jan.* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you be kind enough to let me know, through your paper if it makes a good job to connect the fresh air inlet from house side of trap and bring out in front area within four feet of front of house to act as cesspool?

P. MARTIN.

[If our correspondent means the using of the grating over the ordinary area cesspool trap (the trap part to be removed) as the terminous of the fresh air inlet, we would say that we should apprehend no annoyance from it, though four feet is rather nearer the house than we should care to have it.

To answer this question properly a person should be familiar with the location. The best place to terminate a fresh air inlet can only be decided after a full knowledge of the surrounding conditions.]

LEAD PIPE.

PHILADELPHIA, *Jan.* 11, 1883.

To the Editor of THE SANITARY ENGINEER:

What is considered the best receipt for coating a lead-lined tank to preserve the lead and prevent sweating?

By giving the above your attention you will greatly oblige, Yours, etc., WILLIAM H. DOYLE.

[Pure waters act upon lead more energetically than those containing carbonates. Water containing carbonates will form a carbonate of lead coating in the tank and so prevent or retard the solution of the lead. We know of no instance where this has been practically applied. By the sweating in this case we presume you mean the condensation of water on the outside due to the lower temperature of the water as compared with that of the surrounding atmosphere. This cannot be helped, and in good work safes are provided under the tanks to catch this water of condensation.]

To the Editor of THE SANITARY ENGINEER:

Will you please throw light upon the following: In a discussion about the sewerage of a town near New York city, some advocated the putting of a double trap on the house drain, as has been recommended in case of pressure in the sewers. It was objected to this that if two or more traps were placed on the same drain syphonage would be sure to occur. Now can the presence of one trap on the horizontal house drain, or on any other pipe, affect other traps? Probably these parties were thinking about several fixtures emptying into one soil pipe, and got things mixed. Still, some of them will see your reply; it may do good.

W.

[The presence of a trap on the main drain does not affect the other traps in the matter of syphonage in the slightest degree. We should object to the presence of two traps on the main drain, except in special cases, *i.e.*, where through defects in the public sewers, a back pressure was likely at times to occur. Of course it will be understood that a vent pipe must be run from between the two traps when used.]

If A. H. B., Philadelphia, will give us some clue to his identity, by sending his name, his letter about a horizontal boiler with an answer will be printed in THE SANITARY ENGINEER.

Will J. J. H., of St. Paul, Minn., please send us his name, that we may answer his question about boiler connections.

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THE WASHINGTON PLUMBING REGULATIONS.

WASHINGTON, D. C., *Jan.* 25, 1883.

To the Editor of THE SANITARY ENGINEER:

Enclosed please find a copy of the revised plumbing regulations for this city, which went into effect on the 1st ult., and were published in the *Evening Star* on the 3d inst.

I also enclose a copy of a communication from Mr. Edward Caverly (a master plumber of this city) which appeared a few days later in the same paper.

The Master Plumbers' Association of this city subsequently, by resolution, endorsed the communication of Mr. Caverly in every particular; and also ordered a copy of same, and action taken by the Association be sent to your journal. Very respectfully, yours,

E. G. LANSDALE, *Sect'y.*

2134 PENN AVE., N. W.

"*To the Editor of the Evening Star:*

"As there appeared in the *Star*, of the 3d inst., an article putting forth in detail the amended plumbing regulations for this district, which went into effect on the 1st ult., I would call your attention to some of the comments upon the same as not being sustained by the facts in the case. It is stated that the "original regulations were the result of many patient conferences between the health officer, plumbing inspector and all the leading plumbers in this district." The plumbers should have been left out, for they are neither responsible for any of the mistakes or impracticable features in the old regulations, or the excessively high-priced work called for in the amendments. They have had no voice in the matter whatsoever. Immediately after the passage of the act creating the office of inspector of plumbing, the plumbers received an invitation to meet the health officer in council. They cheerfully responded, and the trade was well represented at a meeting, held at his office, and there a committee of seven was selected to pass upon certain regulations which the health officer *was about to issue*, and which, in the main, were *identical with those then in force in another city governing the same subject.*

"After several meetings of the committee, a report was made to the health officer, which, while it sustained many of the prominent features of the regulations as submitted, suggested certain changes or modifications in others. The end of the matter was that the health officer not only ignored all the suggestions made by this committee, but he did not even extend to it the courtesy of an acknowledgment of the receipt of its report or the letter to him accompanying the same.

"Many of the clauses in the original regulations were bad enough, and the amendments in some respects are worse, and, without much doubt, these regulations will have to be amended again, unless the courts sustain a most unwarrantable exercise of power over private rights, which even a board of health is not usually vested in by law. A few more changes in the same direction will finally place plumbing work in the line of luxuries available only to the rich and well-to-do.

"The statement that, since December 1st, the regulations have been strictly enforced is far from the mark. With one inspector only for this district, and he obliged to remain at his office till 1 P. M., it requires no argument whatsoever to show that it is simply impracticable for him to see these regulations strictly adhered to by all parties in a field so wide as the District of Columbia.

"Very respectfully, yours,

"EDWARD CAVERLY."

1425 NEW YORK AVENUE,
WASHINGTON, *Jan.* 6, 1883.

The regulations governing plumbing are as follows:

TRAPS AND MAN-HOLES.

A running trap shall be placed on every main drain at an accessible point, and a man-hole, with suitable iron cover, shall be constructed over the trap to admit of cleaning the same.

Every main drain shall have an inlet for fresh air, entering on the house side of trap, and carried to such point as may be approved by the inspector.

When necessary to lay a soil pipe under a building, such pipe shall be of iron with leaded joints, and shall be so located as to be readily accessible for inspection. Such pipes shall be kept above ground, if practicable, shall be not less than four (4) inches in diameter, and shall extend above the roof of house; this extension shall be at least four (4) inches in diameter.

Where pipe passes under walls of house there shall be a relieving arch to prevent pipe being broken by settling of brick work.

IRON PIPES.

The weight of all iron pipe used under ground shall not be less than: For 6-inch pipe, 20 pounds per lineal foot; for 5-inch pipe, 17 pounds per lineal foot; for 4-inch pipe, 13 pounds per lineal foot; for 3-inch pipe, 9½ pounds per lineal foot; for 2-inch pipe, 5½ pounds per lineal foot.

All iron, soil and sewer pipes shall be coated inside and outside with coal tar applied hot. All changes in direction shall be made with curved pipes, and all connections with Y branches and one-eighth bends. All connections of lead with iron pipes shall be made with brass thimbles, full size of iron pipe, caulked into the iron hub, and plumbers' wiped joints.

Sub-soil drains shall be provided whenever dampness of site of any proposed dwelling is known to exist. These may be of terra cotta, not connected with sewers, but discharge into a man-hole over running traps, and have a back water valve.

No vault, sink, cesspool or dry well shall be in any way connected with the drainage system of any house, and all vaults, sinks, or cesspools must be water tight.

Rain water leaders when placed inside of any house shall be of iron, with leaded or screwed joints, and when opening below or near any windows shall be effectually trapped.

No brick, sheet metal, or earthenware flue shall be used as a sewer ventilator, or trap vent.

All soil, drain, waste and supply pipes shall be concentrated as much as possible, protected from exposure to frost, and shall be so located as to be readily accessible for inspection.

Every soil, drain or waste pipe inside of the building line, and five (5) feet exterior thereto, shall be of iron.

No trap shall be placed on or at the foot of vertical soil pipes so as to impede circulation of air.

All water-closets, sinks, basins, wash trays, etc., shall have suitable and approved traps placed as near as practicable to said fixtures.

Each and every trap shall have a *special* vent pipe of iron, extending either above the roof of house, or into the soil pipe above the highest fixture.

The vent pipe for each water closet trap shall be not less than two (2) inches in diameter, and for traps under other fixtures not less than 1¼ inches; but if exceeding ten (10) feet in length this pipe shall be not less than one and one-half (1½) inches in diameter.

Waste pipes from bath tubs, wash stands and sinks shall not be connected with the trap of a water closet.

There shall be no direct connection of water closets above basement floor with service pipe.

FLUSHING PIPES.

Means for thorough flushing of all soil pipes, drain pipes and water closets shall be provided in every case.

Where water supply is not ample for proper flushing of water closets, etc., the inspector of plumbing may, in his discretion, order the erection of a tank or cistern into which water may flow at night, or into which it may be pumped.

Cisterns or tanks erected for purposes described in the foregoing paragraph shall not have an overflow pipe connected with any drain, and water supply for domestic purposes shall not be drawn therefrom.

All safes and refrigerators shall be drained by special pipes not directly connected with the house drain or main sewer.

Wooden wash trays and sinks are prohibited inside of buildings; they shall be of non-absorbent material.

The inspector of plumbing shall be notified promptly in writing by the plumber, and upon blank forms to be provided for that purpose, when the plumbing work on any house is completed and ready for inspection. All inspections shall be made as soon as possible after such notification, and the pipes shall be tested by filling with water. No part of the plumbing work of any house shall be covered, or in any manner hidden from view until after such inspection shall have been made, and a certificate of approval issued by the inspector.

The inspector shall promptly condemn and order the removal of any defective material, or any work done other than in accordance with the provisions of these regulations.

Prosecution for infringement upon the provisions of these regulations shall be made by information filed in the Police Court in the District of Columbia.

These regulations shall be subject to alteration or amendment at any time.

In making their approval the commissioners state that it is required that permits shall be kept at hand during the progress of the work to which they relate, and be exhibited whenever required by the proper officers of the District. The police are instructed to arrest any one found making an excavation in the street, or making any sewer connection without permits.

[We fail to see anything in the Washington plumbing rules to justify Mr. Caverly's letter, or the Master Plumbers' Association's endorsement of it. Indeed, we regret to see both. To a casual reader the letter leaves the impression that the complaints are made because there is a restriction on doing cheap work, which is only another name for skin work, of which Washington has had its full share. It is doubtless true that to properly enforce the rules more inspectors are needed, but that is also true of every city. Instead of making complaints such as we present, and talking about "plumbing only for the rich," which is the skin builder's argument everywhere, the master plumbers of Washington should do what they can to sustain the law and render all the assistance possible in its enforcement. The time has gone by for any set of men calling themselves plumbers to oppose the enforcement of reasonable plumbing regulations, and although we might differ on the question of expediency of some details, yet we see no justification for characterizing the Washington regulations as unreasonable.]

THE PLUMBING OF MR. C. VANDERBILT'S RESIDENCE.

WASHINGTON, D. C., *Jan.* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

Your series of illustrations and descriptions of the sanitary arrangements in the Vanderbilt residence have been instructive and interesting. However, we have frequently been moved to offer criticisms thereon, but feeling some delicacy have let them pass. In your issue of Dec. 28, you show the arrangement of slop sinks so objectionable that we will notice it.

The illustration shows a 4" trap. As these sinks are receptacles for chamber slops, spittoon and nursery waste and the d—l knows what, the contents of these 4" traps is quite as offensive and not less dangerous than the matter contained in traps under water closets. These sink-traps cannot be flushed, and will become loaded with filth. The traps are set below the floor with about 2 feet of 4" pipe above the water line—a kind of a dry receiver which will soon become degraded with putrefying accumulations. These conditions being anticipated the plumber (or architect?) has planned a ventilator (alack the term!) consisting of a tube *K* extending through the roof. Usually the air will come down this tube and ventilate the stinking thing all into the house.

Why use anything larger than a 1½" trap under a slop sink? These, if set close up to the sink, may be kept clean.

Hand-hole plates are dangerous, and their use should be restricted to positions controlling junctions in long lines of soil or waste pipe. Usually a 2" hole is as good as a 4" hole. We would limit this hand-hole business to 2" brass screwed plugs and never use them near fixtures which may be removed for access to pipe in the improbable event of a stoppage requiring it.

Perhaps the plumber is not to blame that "the space under the sink and above the safe is not accessible except by unscrewing the wooden casing in front," or that "wooden doors slide down in front of the sink, hiding it entirely when not in use." We did not suppose such things permissible in these later days. It seems to us that a wainscoting of slate or tile as high as the sink back on which all the pipes would show, and a flooring of slate with a short safe pipe set so as to discharge into the sink next below—with all the wood casing omitted—would be much nicer.

It should be borne in mind that three or four stories of 1¼" safe pipe with openings on each floor, and which occasionally receives filthy water or perhaps urine, is an active-factor of bad smells, even if its discharge end is sealed. Safe pipes are for emergencies, and should run separately, terminating at the nearest safe point. Lead linings in close places smell bad—slate for floors is far preferable.

These slop sinks appear to have a line of 5" soil pipe, a line of 3" vent pipe, a line of 1¼" safe pipe and the ventilating pipe, *K*. Is this good practice? We would prefer no trap larger than 1½", and no waste larger than 2"; with 1½" vent for traps and without the ventilating pipe *K*.

The garbage box is the place for old shoes, broken bottles and decayed vegetables, and the waste pipes should not be expected to take the place of the scavenger's cart. We do not think waste pipes of 2" with 1½" traps are more frequently stopped up than 4" pipes with 4" traps.

This criticism refers to slop sinks having no adequate provision for flushing. Of course, where a flushing tank is used there is no objection to a 4" discharge trap, but a trap 4" in diameter cannot be flushed by a ¾ draw cock, and the contents of the trap will be whatever was last dumped into the sink.

Respectfully, H. & H.

In order to give the gentleman who did the plumbing in this residence an opportunity to reply to H. & H.'s criticisms, we showed him the above letter, and have received the following reply:

To the Editor of THE SANITARY ENGINEER:

Your Washington correspondent finds fault with the arrangement of the slop closets fitted up in Mr. C. Vanderbilt's house. He says that these sinks "are receptacles for chamber slops, spittoon and nursery slops, and the d——l knows what," and that "the traps cannot be flushed, and will become loaded with filth, soon becoming degraded with putrefying accumulations." If he will but glance at the diagram and description, he will find that these sinks are made of enameled iron, having an 8-inch strainer over a cone-shaped pipe, tapering down to four inches at the point of connection with trap.

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Immediately beneath the 8-inch strainer the ventilating pipe is connected, and thence is carried to and through a light shaft, used to light the servants stairway, to and through the roof of building and surmounted by a ventilating cap, similar to one which is placed over the light shaft spoken of. These sinks are also capped with slate all around, securely set in cement and secured by screws, thus preventing any slop over into the safe waste, which he fears may "be a cause of bad smells." If he will examine the diagram closely he will find that the shape of the sink combined with the cone-shape pipe, causes the water to thoroughly flush all sides of the pipe, as well as the rim of the closet bowl does to a water closet. As to using a 1½-inch waste from a fixture designed for use as these are, the experience of the plumbers of this city certainly would not warrant them in any such thing (unless, indeed, they were short of work and had no reputation to lose), for it would certainly necessitate an almost daily attendance of a plumber to remove the cigar stumps, nursery waste, and—as he remarks more forcibly than politely—the d——l knows what. And just here another of his points comes under notice, as to the trap screws, or, as he expresses it, "hand-holes." No person at all familiar with plumbing work will deny that if one or more of these "hand-holes" are improperly put in, they may, and do emit sewer gas; but put in by a good *mechanic*, as these are, with rubber washers and brass screws, there cannot possibly be the least danger. As for the air being driven from the vent pipe into the room, even if it could be so, what would this air be but the outside air, which is certainly pure? This pipe being carried through the light shaft, which is heated from the lower stories, causes the pipe to be always warm, causing an upward draft. This system of ventilating soil pipe has been thoroughly tried and not found wanting. Yours very truly,

ROBERT ENNEVER & SON.

"WHAT GOOD CAN BE ACCOMLISHED?" IS THE QUESTION ASKED.

To the Editor of THE SANITARY ENGINEER:

With your permission I desire through your paper, taken as it is by every plumber in Philadelphia, to answer the above.

This question is asked of a committee of seven plumbers, appointed, with a like number of physicians and architects, to arrange for and present to the citizens of Philadelphia as near a perfect system of drainage, and ventilation of traps and soil and waste pipes, as in their best judgment they could; if this only is accomplished, we may consider the effort successful.

But we have as plumbers a higher aim, and that is to elevate the plumbing trade, masters, journeymen and apprentices, to a higher standard than it has ever before occupied.

Plumbers, with some exceptions, are to-day mere machines; and although they may be good machines, they cannot run or do their work, unless a power of some kind starts them.

What we want is educated plumbers, either in the place of masters, journeymen or apprentices; exercising the brains God has given them, in every way and on all occasions, whenever an opportunity offers; to advance themselves and elevate the trade.

It is useless to expect the confidence of those who employ us, unless we understand perfectly our business, and are gentlemen in the truest sense of the word; I do not mean measured by broadcloth, but in principle and action.

If masters, giving our customers full and perfect value for the pay we receive. If journeymen, doing our work in the very best manner and to our employers' interests. If apprentices, understanding that application and attention to whatever we are directed to do will secure for us in the end the master's place.

In a word the object we wish to accomplish is perfect and satisfactory work to the citizens of Philadelphia and ourselves; if this be accomplished, and there is no doubt but that it will, much good will result.

In conclusion, will you as plumbers do your part in this work? Yours respectfully, "One of the Seven,"

Jan. 29, 1883. JNO. WORTHINGTON,
1721 Chestnut st., Philadelphia, Pa.

[A comment on this letter will be found in our editorial pages.]

A CORRECTION.

OFFICE OF THE STATE BOARD OF HEALTH,
ALBANY, N. Y., *Feb.* 3, 1883.

To the Editor of THE SANITARY ENGINEER:

As my attention is called to an incorrect statement on the first page of THE SANITARY ENGINEER of the 1st inst., in which it is reported that the State Board of Health has recommended that a "certain number of towns in Schuyler County should be quarantined," etc., permit me to inform your readers that nothing of the kind has occurred.

Precisely the opposite of any such advice has been given. Small-pox killed a man in the town of Hector on the fourth day from the attack. Upwards of 100 people had been exposed to the contagion before its nature was suspected. Immediately upon receiving information of the case the State Board's Secretary notified the sanitary authorities in eleven towns and four large villages to organize and go on with the duty of vaccination as rapidly as possible, and, at the same time, giving assurance that by so doing they would avoid quarantining against any town. The towns and villages so notified have performed their duty well and with despatch and willingness. The domestic quarantining of the sick has been rigorous and reasonable, and the only extended *cordon* I have heard of was in the case of a prominent citizen of Ulysses who contracted the contagion upon the premises of a dying friend ten miles away. In the moment of local panic a constabulary *cordon* was maintained for a brief period.

In two weeks the entire population of eleven large towns was more effectually vaccinated or re-vaccinated than I have ever before known a like number of people to be, and this by the authority of local boards of health and the coöperation of school officers. This protective work was signalized near its close, by the use of 430 vaccine slips at the Cornell University.

It is to be hoped that no medical or sanitary journal will repeat the absurd statement that has elicited this note,

Respectfully,

ELISHA HARRIS, *Sec, S. B. H.*

[Our statement that it was "reported that the State Board of Health had ordered certain towns quarantined" was based on the following extract from a dispatch to the *New York Tribune* from their regular Albany correspondent who, in alluding to an outbreak of small-pox in the State, said: "The mischief had been done already, however. Among the visitors on Compton, had been an old cattle drover named Abell. He was prostrated by small-pox soon after Compton's death. Many other persons who had visited Compton's house were taken sick either with small-pox or varioloid. Three persons died of small-pox in Compton's own family. The local Board of Health swiftly informed the State Board of Health of the outbreak and received orders to quarantine the town and neighboring towns. Acting under these orders twelve towns about the town of Hector have been quarantined. The alarm felt about the disease is also felt in the towns of Yates County on the opposite shore of Seneca Lake, and these have also been quarantined. Much apprehension is felt in the region that the disease may spread, but the vigorous measures taken by the State Board of Health and the local health authorities it is believed will eradicate it. There were twenty-one such outbreaks of small-pox in the State last year and all were subdued by the State Board of Health. The towns of Tompkins County adjoining the town of Hector in Schuyler County have also been quarantined. Naturally, there has been universal vaccination in Ithaca as well as in the farming regions about it."]

POLLUTION OF THE SCHUYLKILL.

PHILADELPHIA, *Jan.* 23, 1882.

To the Editor of THE SANITARY ENGINEER:

The reason of the bad water in the Schuylkill just experienced (which has now improved), is not such a mystery as might be supposed, as will be seen from the enclosed letter of Chief Engineer McFadden.

Two of the dams drawn *off* receive the sewage of Reading, as well as some of the impurities deposited by the daily precipitation of sulphate of lime, the result of the combination of the lime water from Maiden Creek with the sulphate of iron solution from the mining region.

With this natural neutralization going on daily, almost before their eyes, it is singular that the people of Gilbertson quoted in your last issue, as well as others in the mining region, have not, before this, availed themselves of the *lime cure.* Yours truly,

CHAS. G. DARRACH, C.E.

DEPARTMENT FOR
SUPPLYING THE CITY WITH WATER.
COR. 13TH AND SPRING GARDEN STS., N. Y.
PHILADELPHIA, *Jan.* 13, 1883.

MR. J. R. CUMMINGS, *Chairman of Water Committee:*

An unusual series of contingencies have conspired to cause the bad water from which we have been suffering.

First, the small rainfall in October, November and December, and very small flow of the river.

Second, emptying the Schuylkill canal and eleven dams thereon.

Third, ice covering the water converting the river into a closed channel and preventing ventilation of the water.

The following facts have been collected from Jas. F. Smith C. E. of the Reading canal, and other gentlemen living in the Schuylkill Valley, as well as my own observations.

The rainfall during October, November and December 1882, was four and one-half inches, one-half the usual amount or eight inches; in 1881 it was ten and one-half inches, and the flow of the river is much less than the usual minimum (scarcely more than the low water of summer).

The entire Schuylkill canal as well as nine dams between Schuylkill, Hoven and Blue Mountain, and two dams below Reading have been drawn off; the first nine were drawn December 18 to 23, and the last two December 29 to Jan. 1.

The six dams between the Blue Mountain and Reading, have been covered with ice since the middle of December, about six inches thick.

The six dams above Fairmount have been obstructed by ice since December 4 from two to five inches thick.

The deductions drawn from these facts are: the impounded water drawn from the dams and canals, undiluted by the usual rainfall, flowing under the ice, and only *over* twelve of the dams on the river, has deprived the water of its usual aëration, and prevented the influence of air, sun, light and motion to dissipate the gases.

From experience I have but little faith in any analysis other than that which takes into consideration the amount of oxygen held in solution.

In conclusion I would say that the water is better, and my impression is, that the bad taste will gradually improve.

Hoping this will answer your request and allay the fears of the public,

I am yours truly,

WM. H. MCFADDEN, *Chief Eng'r Water Dept.*

A REQUEST FROM PHILADELPHIA.

PHILADELPHIA, *Jan.* 25, 1883.

To the Editor of THE SANITARY ENGINEER:

As subscribers to your paper, you would oblige us by publishing the following. The call of Philadelphia plumbers to devise means and frame rules for the proper execution of plumbing work, has thoroughly stirred up the question, and nearly all the plumbers are in favor of some law to regulate plumbing work. There are some fine plumbers in Philadelphia, and we are pleased to see effort made to establish a law that will protect them. If we had been present at the meeting called some weeks ago, we would have proposed Mr. H. J. Burke, one of our leading plumbers, a master mechanic, of thirty-three years' experience, who would do credit to Philadelphia plumbers, as one of the committee. In looking at one of his drawings lately, we found a plan that would do any expert good to examine. It is the best and safest plan we have yet seen. We trust that the committee will appoint practical plumbers to represent us, so as to exchange our views with the plumbers of New York, and elsewhere.

Res'py, P. TOLAND,
J. W. WOILT,
ANG. BREEN.

PLUMBING LAW VIOLATIONS.

The number of violations of the Plumbing Law reported to the Board of Health of this city in the week ending Saturday last, is greater than usual, but most of them are not of a serious character. Inspectors Hollick and Hooper report seven each, and Inspectors Elliot and Eagleson one each.

Bills to compel hotel owners to put up fire escapes are staple articles of legislation in various States just now, but any hotel which has to be compelled to take this precaution is a good hotel to sleep outside of.—*Philadelphia Inquirer, Jan.* 1883.

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NEW YORK STATE BOARD OF HEATH.

RULINGS AS TO MIXTURES.

We last week published a list of exemptions or standards that the New York State Board of Health had adopted under the Food and Drugs Act, then awaiting the approval of the Governor.

These rulings have produced no little excitement among manufacturers and dealers of food products, and mainly because it is proposed to require that the proportions of each mixture be stated on the label. They hold that this is a needless interference with trade, and practically makes public the results obtained by experience, the benefits of which belong to the manufacturer.

So long as the adulterants are kept within the limit fixed by the Board, it is held that no public good is to be gained by the publication of proportions.

The English law recognizes this fact, and does not require that proportions shall be stated. We think it right that the label should guarantee that the amount of pure article required by the Board is present; also that the names of the constituents should be stated, but not the relative proportions. In fact this is an important question, and we should like the views of our readers on it. We believe that some good can be accomplished by an avoidance of extreme measures, and that the Board should do all they can, consistent with their duty, to avoid unnecessary antagonisms.

PROSECUTIONS UNDER THE FOOD AND DRUG LAW.

The trial of druggists and grocers for selling adulterated articles, was resumed at the Court of Special Sessions, in this city, last Monday, and two cases disposed of.

John O'Connor, a grocer, of 838 Tenth ave., was charged by Inspector Colby, with selling one pound of coffee which was adulterated with 15 per cent. of chicory. He plead guilty, but said that he bought the article for pure coffee. As his store was a small one, he was fined only five dollars.

George Cutts, a druggist, of 508 Third ave., charged with selling one ounce of "precipitated sulphur" adulterated with over 30 per cent. of sulphate of lime, plead not guilty, but was found guilty by the Court and fined ten dollars.

THE NATIONAL BOARD OF HEALTH.

On the 26th ult., Mr. Harris, of the Senate Committee to investigate and report on the best means of preventing the introduction and spread of epidemic diseases, presented the report of the Committee recommending the repeal of sec. 10 of the Act of June 2, 1879, by which the powers conferred on the National Board of Health under that act would expire June 2, 1883. The Committee's report contains a summary of the history of the National Board of Health, especially in its relation to the yellow fever epidemic of 1879.

Reciting the course of the epidemics of that year and the preceding, the Committee go on to say that the experience of the country then gained has "inspired great confidence in the South and Southwest in the possibility of effectually preventing, or successfully dealing with and controlling, these epidemics. The great transportation companies of the South, both river and rail, are unanimous in their approval of the action and methods of the National Board in dealing with such cases, because experience has shown that they give the necessary security against the spread of disease, without stopping, or retarding to any considerable extent, commercial intercourse.

"They have learned from their own experience that the certificate of the National Board of Health as to the sanitary condition of any city, or place, is accepted by other cities and States as testimony coming from a strictly impartial and well-informed authority, independent of all local interests or influences, commercial or otherwise. The action and methods of the National Board have been approved by the State and local boards of health throughout the country, almost without exception, by the American Medical Association, the American Public Health Association, the National Academy of Sciences, the transportation companies of the South and Southwest, boards of trade, cotton exchanges, and other associations of business men throughout the country. In the opinion of the committee, the Board has accomplished much, and is capable of accomplishing highly important results of great benefit to the country, results which can be accomplished by no other agency.

"We have had State and municipal boards of health for very many years in the past, but we have also had epidemics of imported contagious and infectious diseases not unfrequently within the same period. If we could prevent these epidemics, we must have a general system applicable to every port through which contagion can be imported, uniform in its requirements in respect to quarantine, and rigidly enforced, without regard to local commercial interests or influences, and the time for greatest vigilance in the enforcement of these preventive measures is when the country is entirely free from these diseases.

"But even when they have appeared, the experience of 1879 has shown that, with proper care and effort, they can be confined within narrow limits, if not stamped out entirely. But to do this requires prompt action, and an amount of means rarely, if ever, at the disposal of a municipal or State Board of health."

After reciting at some length precedents to justify legislation by Congress for the establishment of general quarantine regulations, and the control of commerce to prevent the conveyance of contagion, the report of the Committee closes in the following language:

"If it be admitted, as it is believed all must admit, that the action and operations of the board even tend to the preservation of life and health to any, however small the extent, such fact makes it eminently worthy of our support, and in the opinion of the committee it should be sustained with such powers and means as will enable it to perform its functions fully, promptly and efficiently.

"When the memories of the fearful ravages of the epidemic of 1878 were fresh, both houses of Congress were ready to appropriate, and did appropriate, all that the committee asked, for the purpose of endeavoring to find, if possible, a means of preventing the recurrence of this terrible scourge; but as the memory of the hundred thousand sufferers and the twenty thousand new-made graves of that period are fading from our minds, the committee has experienced more or less of difficulty in obtaining the appropriations necessary to enable the board to perform the important duties which devolve upon it, and, indeed, found it impossible at the last session to obtain adequate appropriations.

"The practical question, as it appears to the committee, is, the country being now free from yellow fever and cholera, shall we use the necessary means to keep it so, or relax into indifference, withhold the powers and the necessary means to prevent their importation, and await the outbreak of another epidemic, which will cost the country hundreds of millions of dollars and thousands of the lives of our people, to awaken us to the importance of preventive measures in which the committee believes we can find absolute security?"

THE LOUISIANA QUARANTINE DECISION.

The New Orleans *Times Democrat* of Jan. 27 publishes the following extracts from a letter received by Dr. Chaillé from "one of the most distinguished practical Sanitarians in the North," which will be found of interest as regards the New York Quarantine.

"Judge Monroe's decision is of sufficient importance to merit a wide circulation. But you are doubtless aware that the same conclusion has been reached by several other courts, and I have no doubt it will be sustained by the higher courts and by distinguished lawyers out of court. For New York, in drawing the bill which was enacted into our quarantine law of 1883, I had occasion to go over the ground thoroughly with my friend, the late Hon. Hy. C. Murphy, at that time State Senator, and since that time with Charles O'Connor. There is a broad distinction between fixed fees established by the State to be paid a health officer for actual service in ascertaining the fitness of a ship to enter port without danger and quarantining her, and exacting pay as a revenue to the State, to be paid out subsequently for services rendered by a health officer or for any other purposes. Hence I have found that in the opinion of the distinguished lawyers above referred to, the special fees for the protection of the port—for actual service as practiced in New York—are legal, and so, too, whatever expense incurred by a ship, to render her admissible to pratique. Hence all attempts in New York to make the office of health officer a salaried officer and to charge and conserve fees to meet the salary and expenses (as in your case) have been overruled. The effort is just now again under discussion by fresh hands, Gov. Cleveland having suggested it in his message. But I have no doubt the result will be as heretofore. The same decision as Judge Monroe's was reached in Georgia four years ago, after a large fund had accummulated at Darien, under exactions similar to those of Louisiana. South Carolina last year passed the same kind of an unconstitutional law, on which I had occasion to write to Dr. Libby (health officer at Charleston), who was active in securing it, that it was unconstitutional."

NOTES FROM CHICAGO.

[From our Special Correspondent.]

CHICAGO, *Feb.* 1, 1883.

The regular meeting of the Master Plumbers' Association, this evening at their hall, No. 185 Clark street, drew out, despite the storm and the rush of trade, over thirty members, D. J. Rock, the President, occupying the chair and Alex. Murray, Secretary.

A vote of thanks to Professors Jackson and Angear, for their entertaining lectures the other night, was unanimously carried. Incidental expenses were only $60, and congratulation was hearty on the successful starting of the lecture course. At the next entertainment Allen P. Creque, of New York, was invited to speak on a new system of hydraulic and sanitary plumbing.

A communication from Philadelphia, signed by Weaver & Pennock, asked for by-laws, etc., with information as to organization, "as there is a movement starting to form a master plumbers' association in this city."

Some discussion followed favoring the formation of a National Plumbers' Association.

Regarding a communication from New York, reporting the appointment there and in Brooklyn of committees on protection, and asking for a Chicago committee on coöperation, action was deferred till next meeting, as there seemed some uncertainty as to what the joint committees were to protect.

After full debate, it was decided that the Secretary should keep a "black list" book, to be seen, added to, or amended only in open meeting, in which should figure those unworthy members of the craft "who willfully would do a bad job, be negligent of duty, habitually went on drunken sprees, and generally were botches."

The holding of a competitive exhibition of Master Plumbers' skill, at the Exposition Building, sometime in the summer, was advocated.

Finally, a committee, acting under instructions, will shortly submit to the press and public "the best mode of taking care of a heated water back, so as to further instruct the people as to their use."

Mr. J. B. McCallum, Borough Engineer, has submitted a report on the pail system in Blackburn, to the Sanitary Committee His conclusion is that the introduction of the pail system was of great benefit in reducing the number of offensive privies, but he is also convinced that any extension of the system means an increase of rates, as no process of manufacture "has yet been established which defrays the cost of collection and preparation of manure for sale." He reckons that if the whole of the contents of the pails, which deal with the excreta of one-half of the population, could be reduced at the Finnington works and sold, the annual loss would be about $20,000. The extension of the pail system beyond its present limits is opposed, and it is recommended that in buildings to be hereafter erected hopper water closets with waste preventing cisterns be used.

ENGINEERS' CLUB OF PHILADELPHIA.

At the meeting Jan. 20, President Henry G. Morris in the chair, Mr. Wm. E. Lockwood presented a full description of the Shaw Locomotive, profusely illustrated by magic lantern, working model, etc.

Mr. Wilfred Lewis exhibited a machine for the graphical determination of centre of gravity and moment of inertia of plane areas. The figure to be calculated is drawn to a suitable scale and placed in the machine, where the outline is followed by a tracing point in order to produce, upon another piece of paper, a figure whose area shall be proportional to the statical moment of the given figure about an assumed axis. If, now, the second figure be followed by the tracing point and a third figure be drawn, its area will be proportional to the moment or inertia; and from the areas thus drawn can be found, by simple arithmetical processes, the centre of gravity and moment of inertia. The machine is intended for application to such figures as cannot readily be solved by the usual methods, such as deck beams, steel rails, and castings, with round corners, large fillets and curved sides, which can only be approximately solved by long and tedious integrations.

LONDON SMOKE.—London has only about 24 per cent. of sunny days, while towns near by have, on an average 12 per cent. more.

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Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

MACHINES FOR THE CONSTRUCTION OF CONTINUOUS STONE PIPES.

The simple form of the machine described below was invented in 1879, by E. M. Hamilton and C. N. Earl, of California, and is said to have been extensively used since in that State, chiefly in the construction of drain tile and sub-irrigation pipe. Improvements have since been made by Wm. M. Clemens, of Michigan, whose patents, together with the rights to most of the Eastern States under the old patents, have recently been purchased by the "National Continuous Stone Conduit Co., of 62 William street, this city, who are about to place the machines on the market.

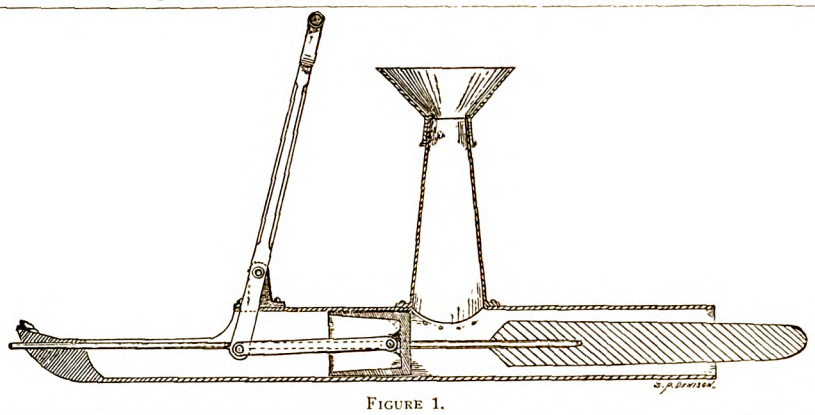

FIGURE 1.

They are designed for the construction, in the trench where they are to remain, of continuous artificial stone pipe, for drains, conduits, electric tubes, and other purposes for which underground pipes are used.

Figure 1 is a longitudinal, vertical section of the single pipe machine, in which the principle of construction and method of operation are most clearly shown. The body of the apparatus consists of a hollow cylinder, the inner diameter of which is the same as that of the outer diameter of the pipe to be made. The upper half of the front part of the cylinder is cut away, and the end of the remaining semi-cylinder turned up like a sled runner, and for the same purpose, for the whole machine slides along on the earth in the bottom of the trench as the construction proceeds, being propelled by the same power and motion used to form the pipe, and by its pressure and movement on the earth preparing a bed in which the pipe is to rest. At a point in the solid front end, on the line of the axis of the cylinder, is attached a rod which extends back beyond the centre, and has at its end a solid rubber cylinder, which is the core of the pipe to be formed, and hence of the same diameter as the inside of the pipe. In the top of the hollow cylinder, and just in front of the core, is an opening over which is fixed a feeding tube or hopper. Into this is put the plastic material (cement mixed with sand and water in various proportions, according to the objects of the pipe) which is forced back and made to fill the space between the core and the cylinder, by a piston called the "former," which is worked by a lever, as shown. The same stroke which compresses the material into the mold carries the whole machine forward the same length that is added to the pipe, while the rubber core or "follower" smooths the inside of the new section of pipe as it is withdrawn. In constructing drain tile, openings are made for the admission of water by drawing a trowel across the upper part every 15 or 20 inches, cutting nearly to the bottom of the opening.

Figure 2 represents a similar machine, but capable of making 12 tubes at once, all in the same piece of stone. Below the machine, on the left hand, is shown a cross section of the "former" belonging to this style, and beside it two different patterns. These many-tube styles are designed especially for electric underground wire carriers. It will be seen that every different size and shape of pipe requires a separate machine, but that any size (within limits), thickness, or arrangement is possible by making the formers and cores of the desired shapes.

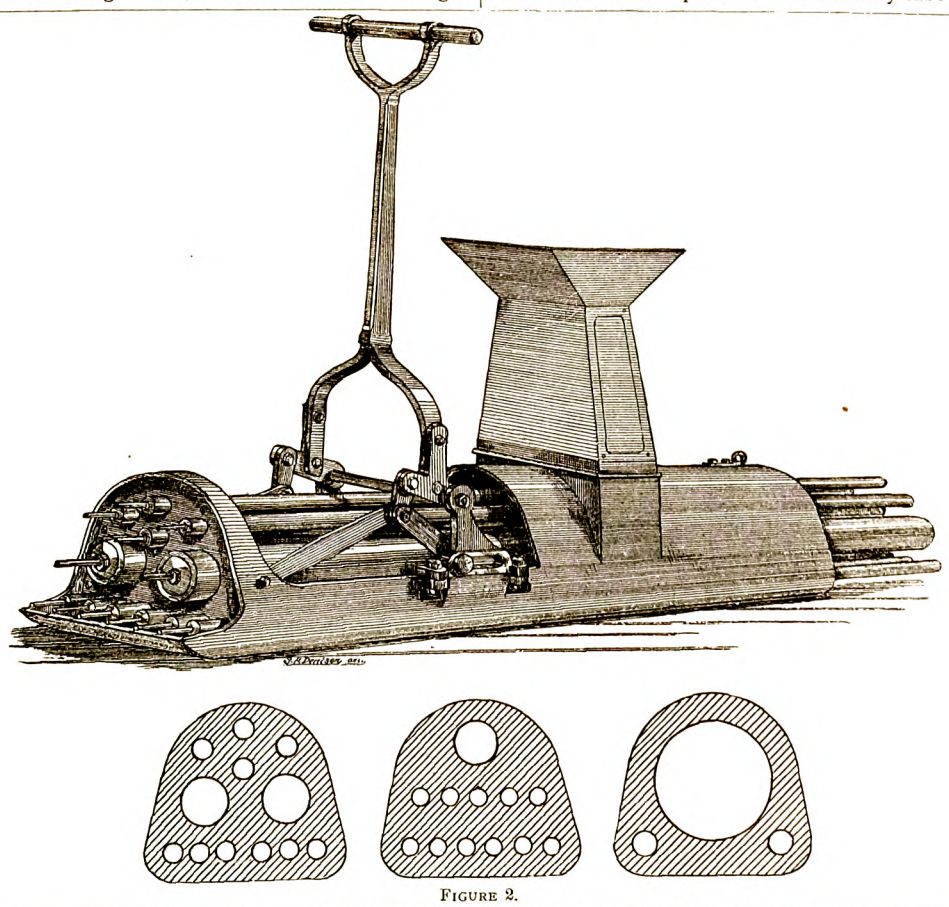

FIGURE 2.

Construction Notes.

BOSTON.—The Water Board has recommended a 48-in. water main from Brookline Street to Westchester Park. Cost $78.050. The aldermen at their meeting, Jan. 30, referred the recommendation to the Committee on Water.

HARRISBURG, PA.—Two plans for the new market houses have been received by the committee on the market house, by D. R. Miller of Harrisburg, and Durang. These are for one story buildings for which the committee advertised. The committee have agreed to submit to councils; also a plan for a two story building by a Mr. Alricks. The Miller plan provides for two buildings 173 x 65 feet of stone and brick. Cost $31,000. The Durang building is estimated to cost $31,567.

ONEIDA, N, Y.—The subject of water works is being agitated again, a company will probably be organized which will ask the village to give them the exclusive right of furnishing water. They propose to locate a reservoir near Sand Hill.

DANVILLE, ILL.—We are informed by Mr. R. P. Corbyn, Engineer of Construction of the Danville Water Works, that contracts have been awarded as follows: Dennis Long & Co., of Louisville, Ky., furnish the pipe; Geo. F. Blake Mfg. Co., of New York, furnish and erect, complete, the pumping engines and boilers, and give the machinery, ready to start; J. M. Hankey, of Danville, puts up the pump house, and Rohan Bros., of St. Louis, the stand pipe, which is to be 40-inch diameter and 200 feet high. L. M. Brown, of Danville, is to lay the pipe, of which there will be about 13 miles, and the Ludlow Valve Co., of Troy, N. Y, furnish the valves.

COUNCIL BLUFFS, IA.—Reports state that the water works now being constructed by the Council Bluffs City Water Works Co., are rapidly approaching completion. A centrifugal pumping engine capable of pumping two and a half million gallons of water per *hour* is to be used to pump the water from the Missouri River into the two large settling reservoirs. From these reservoirs the water is to be pumped into a storage reservoir holding over three million gallons of water. All of the distributing mains—a little over sixteen miles in length—are already laid, and 152 fire hydrants are set in place complete.

CINCINNATI.—A number of Easton and Cincinnati capitalists are engineering a scheme to obtain from the State and city the bed of the canal that worms its way from the northwest to the southeast through the city. They propose to cut off the canal when it enters the city and take it due south along the mill creek bottom to the Ohio river. They propose farther to make of the vacated canal at the same time a boulevard and railroad tracts by running trains below the street grade and roofing over. There is no doubt that the stagnant water of the canal is a nuisance and unhealthful, for which its utility within the portion of the city it occupies is no equivalent. There are other designs upon it, however. It is wanted for a city help railroad by existing railroads, and there is a movement among citizens to devote it exclusively to the purpose of a boulevard.

FINDLAY, O.—The subject of water works is exciting earnest discussion.

MATTOON, ILL.—The Council have under discussion a proposition from Travers Daniels, of Clarksville, Tenn., to establish water works.

COLUMBUS, O.—The contract for furnishing material and constructing the Fulton street sewer has been awarded to John Creenane for $16,000. City Engineeer Graham reports on the Broad street brick sewer, 5 feet and 4½ feet inside diameter. He estimates the cost at $17,874. The Council, Jan. 29, passed a resolution requesting their representatives to press the bill in the State Legislature giving counsel the authority to issue sewer bonds to the amount of $200,000 for the sewer fund, to be expended on the sewers now under construction.

UNIONTOWN, PA.—An offer has been received from W. T. Kirhan, of Pittsburg, to construct water works at his own expense, provided the borough would pay $1,200 per year for 30 fire plugs.

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CINCINNATI.—The Council, Feb. 2, passed a resolution to request the Legislature not to pass the bill authorizing the issue of $6,000,000 of water bonds for the removal of the water works to Markley Farm.

MIDLAND, MICH.—The water works are completed. The pumps have a capacity of 1,500,000 gallons daily; M. Walker, of Port Huron, contractor.

MONTREAL.—A tender for scavenging was received from Mr. Mann, the present contractor, for $14,000. The Health Committee of the Board of Aldermen regarded this as excessive, and have put the work under the supervision of three Aldermen for a month, until other arrangements can be made.

ROCHESTER.—Superintendent D. S. Almstead, of Mt. Hope reservoir, reports for January as follows: amount of water used in city was 155,939,100 gallons. The largest amount of water used during 24 hours was 6,373,600 gallons.

NEW YORK.—The lowest of the bids for a lot of iron pipe fittings, etc., opened on the 2d inst., at the office of the Department of Public Charities and Corrections was $644.12, by Sam'l W. Sears. His bid of $69.83 for 18 Simonds Manufacturing Co. hot air registers (15 inches), six barrels charcoal and ten pounds rosin, was also the lowest.

KINGS COUNTY, N. Y.—Proposals for a new iron turntable for the wooden bridge over Newtown Creek at Blissville were received by the joint Committee of the Boards of Supervisors of Kings and Queens Counties on Bridges, on Jan. 31, as follows: John D. Leary, $7, 344; Howell & Saxton, $3,587; the same, another pattern, $3,800. John H. O'Rourke offered to put in order the present disabled turntable and operate it three years for $3,500 a year.

PHILADELPHIA.—The committee on survey of council agreed to recommend to council the construction of the sewers on the following streets: On Clearfield street, from Germantown avenue to Sixth street; from Fifth street to Second street, at a cost of $50.000; Mayer street from Vienna street to Montgomery avenue; Oxford street from Ridge avenue to Twenty-first street; Nineteenth street from Ridge avenue to Girard avenue; on Montgomery avenue from Sixteenth to Seventeenth streets; Nicholas street from Twenty-fifth to Twenty-sixth streets; Ontario from Seventeenth to Eighteenth streets; Winter street from Fifteenth to Sixteenth streets; Jefferson street from Eighteenth and Bouvier streets; Tenth street from York to Dauphin streets; Verango street from Seventeenth and Twentieth streets.

At the same meeting the plans for the construction of the new Market street bridge over the Schuylkill river, were submitted by the Chief Engineer of the Survey Department. The bridge is to consist of three arches, the two end arches being each 117 feet, the centre one 123 feet; the bridge is to be constructed of stone, and is to be 100 feet broad.

The piers supporting the bridge will have to be built anew, the old ones not being serviceable. For the construction of this bridge the City Council have appropriated the sum of $300,000.

The plans for the contemplated sewer to carry the sewage from Manyunak to below the Fairmount Dam was also submitted. It is to be built along the east river bank and will not obstruct the Park drive. For this work Council some time ago appropriated $100,000.

Abstract of bids for granite for Deleware Breakwater Harbor, January 27, 1883:

Jas. M. Andrews, Biddeford, Me., $3.50 per ton (2,240 lbs.); Francis H. Smith, New York City, $3.23 per ton; John Beattie, Leetes' Island, Conn., $3.25 per ton; Mt. Waldo Granite Works, Frankfort, Me., $5.42 per ton; Ellsworth & East Blue Hill Granite Co., Ellsworth, Me., $5.97 per ton; Wm. H. Browne, Brooklyn, N. Y., $3,23 per ton; Leiper, Lewis & Ward, Chester, Pa., $4.23 per ton; George G. Leiper, Chester, Pa., $3.42 per ton; Conshohocken Stone Quarry Co., Philadelphia, $4.35 per ton. The award for the work has not yet been made, there being two whose bids are the same, $3.23.

CHICAGO.—The City Council, by order passed Jan. 30, directs the Commissioner of Public Works to "take the necessary steps" to cover the La Salle street tunnel for one-half a block, from Lake street southward. Bids will be invited; the roughly estimated cost is $30,000.

A bill has been reported in the Legislature of Massachusetts incorporating the Spencer Water Company. Capital $200,000.

BOSTON.—The annual report of James C. Tucker, Superintendent of Public Buildings, shows that $95,791, was expended last year on city buildings, except school houses and county buildings. Expenditures for ordinary repairs, supplies and furniture for the school houses amounted to $192,879, repairs to county buildings $41,716. The total valuation of county and public buildings and school houses including land and furniture is $18,883,300.

A contract was awarded to the Mt. Waldo Granite Works of Frankfort, Me., Feb. 1, for the sum of $945 for the granite coping for the approaches to the Custom House at Hartford, Conn.

The Cincinnati Board of Public Works has been notified by the attorneys of the "National Liquid Leak Detector Company" that the Bell "Waterphone" is an infringement on a patent owned by the company of an invention of W. W. Bostwick in 1879.

Among the contracts awarded by the Fire Commissioners of Philadelphia for supplies for the department were, for red brass castings at 21⅞ cents per pound, gun metal at 21⅞ cents per lb., bell metal at 28 cents per lb., anti-friction metal at 29 cents per lb., iron castings at 5 cents per lb., malleable iron castings at 15 cents per lb., boiler rivets, varying according to size, 8 to 10 cents, domes for engines at $85 each.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

No 61 south Fifth av, b st and ten; cost $18,000; o, Ronald and Addison Thomas, trustees... 428 e 17th st, br ten; cost $15,000; o, John Kehoe; a, F. W, Klemt; b, S, Niewenhous and Chas. Lehmann..... 258 Avenue B, br st and ten; cost $14,000; o, Mrs. Mathilde Jantzen; a, J. M. Forster....21st st, s s, 300 w Tenth av, two br tens; cost ea $12,000; o, Clinton Sutphen; a, Geo. B Pelham....Tenth av, e s, 100 5 n 46th st, extending to 47th st, four br st and ten; cost ea $15,000; o, John J. Astor; b, John Harny and John Downey. ..Tenth av, e s, from 47th to 48th st, eight br st and ten; cost ea $15,000; o and b, same as last....Tenth av, w s, from 48th to 49th st, eight br st and ten; cost ea $15,000; o and b, same as last....Second av n w cor 71st st, br ten; cost $17,000; o. Mary M. Kircheis; a, Wm. Jose....Second av n w 26 n 71st st, three br ten; cost ea $11,000; o and a, same as last....78th st n s 275 w First av, four br st ten; cost ea $15,000; o, Jacob L. Maschke; a, Jno. C. Burne; b not selected ...Avenue A, s w cor 90th st, br school house and infant asylum; cost $45,000; o. Jos. Helmprecht; a, A. H. Blankenstein; b not selected....120th st n s 65 w Lexington av, three br tens; cost each $15,000; o, Patrick Dempsey; a, Cleverdon & Putzel....138th st, s s, 75 e Southern Boulevard, br ten; o, P. Whelan; a, J. F. Burrows.

ALTERATIONS, NEW YORK CITY.

Seventh av, s w cor 57th st, repair damage by fire; cost $15,250; o, a and b, Wm. Noble....515 to 527 w 33d st, br exten, interior alter; cost $3,000; o, Chamberlain & Roe; a, R. Mook....29 Barclay st, new floors, elevator, roof, sidewalk vaults, etc.; cort $10,000; o, Oliver A. Gager; a, R. B. Eastman; b, R. B. Eastman & Co....238 Fifth av, br exten and alter; cost $10,000; o, Clifford Coddington; a, Babcock & McAvoy; b, Louis Adams....28 Broadway and 75 New st, br exten; cost $40,000; o, Wm. D. Parsons; a, R. N. Anderson; b, not selected... West n e cor Beach st, interior alter; cost $5,000; o, Old Dominion Steamship Co., N. L. McCredy, J. Bodine; a and c, W. Rouland; m, R. Shapter. ..36 w 14th st, new store front; o, Mathilde Meyer; a, H. J. Schwarzman & Co; b, J. J. Clarke....104th st, n s 160 w Avenue A, addn, cost $5,000; o, Frances H. Duclos; a, A. Hatfield; b, T. W. Banks....27 Greenwich av, addn; cost $3,000; o, Diedrich Fink; b, J. Jordan....405 e 18th st, br exten; cost $7,000; o, John Bickmann; a, F. W. Klent....Av A, s e cor 86th st, new st and br exten; cost $3,000; o, Henry W. Newman; a, John Brandt....147 and 149 w 32d st, exten to 147, main bldg exten to 149; cost $10,000; o, Benedict Fisher; a, Thom & Wilson....13 Allen st, br exten; cost $3,000; lessee, Fred J. Selig; b, John Derr....129 e 29th st, br exten; cost $6,000; o, Danl E. McSweeney; a, R. W. Buckley.

BROOKLYN.

Sackett st, s s, on e s Gowanus Canal, fr shed; cost $6,800; o, Fulton Municipal Gas Co.; a, J. F. Harrison; b, R. Deeves....6 and 8 Union av, e s, 25 n Broadway, two br salesrooms; total cost $10,000; o and b, Louis Bossert; a, Th. Englehardt.

ALTERATIONS, BROOKLYN.

Forest st, n s, 125 e Bushwick av, st exten; cost $3,500; o, Claus Lippsin; a, C. Stoll, b, H. Grasmann and J. Rueger....169 Clymer st, br exten; cost $3,000; o, A. C. Washington; a, M. Singer; b, Jacob Bierds.

BOSTON, MASS —Paris st n Brooks st, b Parochial School; o John J. Williams....Cambridge st, cor Parker st, br dwel and st; o Wm. Burns; a John Burke....Cambridge st, cor Crescent st, br Mechanical bldg; o Louis B. Davis; b Geo. C. Meyers... 219 D st, fr dwel; o Michael Hugh & Co....217 D st, fr dwel; o Cambbell....Florence st, n Ashland st, fr dwel; o Matthew Quigley; b Alex. Rogers .. Cottage st, n Dudley st, fr dwel; o, Emma Mills; b, Jas. C. Mills.

BOSTON, MASS.—Bedford st, Harrison ave, extension of mercantile house, br and b st, 160 ft front; o, R. H. White & Co.; a, Peabody & Stearns.

CHICAGO, ILL.—Wabash av nr Monroe, improvement of st, st build, cost $6,000; o, S. M. Rothschild; a, J. C. Cochrane; b, not settled. ..S. E. cor Monroe and Dearborn, bank and office build; sto, br and terra cotta; cost, about $600,000; o, Syndicate Controlling Commercial Note Bank; a and b undetermined....Thirty-ninth and Wentworth av, br and st Church of St. Catharine of Sienna; cost $25,00; o, Arbp. of Chicago; a, Grey Vigeant; b; not determined....S. E. cor Division and n Clark sts, br office bl'dg, cost $25,000; o, Chicago North Division Railway Company, a, N. W. Wright; b, A. Gurteen....N. E. cor Ohio and Union sts, br offices and barn, cost $8,000; o, Schlitz Brewing Co; a, Fred W. Wolf; b, the company .. Weed cor Dayton, br factory, cost $6,000; o, Poths & Co; a, F. Walter; b, Albert Ruck & Co., masons, P. C. Baumgarten....Illinois av n Thirty-second st, ten br cottages, cost $8,000; o, S. E. Gross; a, none; b, not decided....67 Cass, br addition to house, cost $6,000; o, E. B. McCagg; a, H. M. Hansen; b, J. B. Cox.

At Chicago, Ill., a block of stores and a warehouse are to be erected on State st, near 16th, for Allen Bros., at a cost of $60,000; a, B. W. S. Clark. And on West Jackson st a block of stores and flats to cost $20,000, are to be built by F. Williams, who is also building himself a residence at Oak Park, at a cost of $8,000. The architect for both plans will be B. W. S. Clark.

CINCINNATI, OHIO.—5, 7 and 11 E 5th st, repair 5 st br, cost $2,500; o, A. Gunnison; b, Frank Byrnes....E. S. Spring near Woodward, br dwel, cost $5,000; o, C. Bassenhorst; b, Fr. D. Kallendorf....S. S. of Union bet Elm and Race, 7 st br dwel, cost $20,000;o, Louis Stix & Co.; a and b, A. C. Nash....E. S. of Elm bet 14th and 15th, 4 st sto front, cost $5.000; o, Mrs. L. Rover.

MILWAUKEE, WIS.—Grand ave, bet 2d and West Water sts, Plankinton House improvements; cost $20,000; o, A. E. Townsend, Mix & Co.....Michigan st and Broadway, fireproof hotel on site of Newhall fire; br, st and iron, 200 rooms; cost $400,000.; a, E. T. Mix.

PHILADELPHIA, PA.—203 and 205, Gaskill, br dwel; o, Mrs. J. McMullen....Berks, s w cor 23d, church bl'd, a, E. F. Durang; Indiana av e of Sixth st, 6 br dwels, o, J. S. Kelly....Manayunk av e of Cedar, br dwel, o, Jas. H. Boone; Chestnut, 1305 to 1309, int alt, o, John Wanamaker.

ST. LOUIS, MO.—Pine st, bet, 8th and 9th sts, 4 story hotel, cost $50,000; o, Leo Moser; a, McElfatrick....12th st, bet, Gratiot st, and Choutean ave, an iron clad, cost $8,000; o. Duncan Parker & Co.....Hebert st, bet 15th and 20th sts, br dwel; cost $5.000; o H. Stursell; c Louis Yalger. ....Rutger st, bet 2nd Carondelet ave and Mississippi ave, br dwel; cost $10,000; o W. Patterson; c Thos. Gugerty....Morrisson ave, bet 11th and Morton sts, b dwel; cost $6,500; o, R. B. Sheridan; c, Thos. Gugerty....Lynch st, bet State and Menard sts, ice man'f; cost $10,000; o Louis Obert; c Herman & Schumacher.

MISCELLANEOUS.

ALBANY, N. Y.—Hudson ave and Green st, Mercantile building in Holland Dutch style; o, Thos. Owens; a, F. H. Janes.

BRIDGEPORT, CONN.—A new factory to cost $65,000, by Messrs. Fletcher, Pinkham & Farrel. Ground donated by P. T. Barnum, N. T. Worden and others.

CLINTON, IOWA.—In Jackson Co., near Andrew, on County farm, br dwel, cost $8,000; o, Jackson Co.; a, W. W. Sanborn; b, Jacob Becker.

CHICAGO.—The majority report of committee on public buildings, jail and criminal court, recommending the adoption of Architect Egan's plans for improving jail and criminal court buildings, and the advertising for proposals, has been adopted by the county commissioners.

DENVER.—Champer st, add, to hotel, cost $2,000; o, S. Holtzman.... 235 Holliday st, br, stores, cost $13.00; o, W. H. Lyon....17 Lincoln ave, br dwel, cost $6,500; o, W. F. Tupper; a, L. Cutshan ....Curtiss st, alt Grand Army Hall, cost $9,242; o, J. B. Hatch; a, E. P. Brink.

DUCKVILLE, MASS.—The Boston Duck Co. will immediately rebuild the dye house and finishing department recently destroyed by fire.

FALL RIVER, MASS.—The Flint Mills will rebuild on site of old mill recently burnt; plans by Mr. Thompson, of Providence, R. I.

GLOVERSVILLE, N. Y.—Brick school house; cost $12,000; b, D. E Sutliff & Co., ventilated by "Ruttan" patent method.

KANSAS CITY, MO.—Lots 32, 33, and 34, block 12, Dundee Place, M. E. Church; cost $20,000.

MINNEAPOLIS.—West's hotel; cost over $1,200,000. Present contract is for $837,000, to be finished in June; of brick, marble masonry and iron. Thoroughly fire-proof. To contain 450 rooms; a, L. S. Buffington.

NEW YORK.—An addition to the Fifth Avenue Hotel, to be on 24th st, as far as the Madison Square Theatre; will be commenced in the spring; a, D. & J. Jardine.

NEW DURHAM, N. J.—The building to be erected here by the West Shore Railroad will cost $300,000. Andrew Bogert, of Englewood is drawing the plans.

NASHVILLE, TENN. The new colored school on South Summer street of brick, will seat 700 children; cost $12,000.

ONEIDA, N. Y.—W. R. Williams will be the architect and builder of the brick residence of Mr. A. R. Randall.

ROCKAWAY, L. I.—A syndicate represented by Gen. Francis C. Barlow has bought the large hotel, and it is understood will furnish it and open for business next summer.

STAMFORD, CONN.—A new Presbyterian church to cost $60,000, is to be built.

SOUTH WORCESTER, MASS.—Carpet mill, of br and wood; b, G. M. J. Whithall.

TROY, N. Y.—Third st, near Ferry, two b st dwel, cost $11,000; b, Edward Kelly....Second st. two br, dwel, cost 6,000 each; b, Edmund Broderick....Second st, b st dwel, cost $6,500; b, Jackson.

OUTSIDE POINTS.—Iowa City, Iowa, br and st medical college; cost $30,000; o, Iowa State University; a, J. C. Cochrane; b, Thomas & Hugh Colwell, of Ottawa, Ill.....Marshall, Saline Co., Mo., br and st court house; cost $56,000; o, the county; a, J.C.Cochrane; b, John Volk & Co., of Rock Island....Valparaiso, Ind, cut st and br court house; cost $100,000; o, Porter Co; a, J. C. Cochrane; contract not yet let....Atlantic, Iowa, st and br court house; cost $56,000; o, Cass Co.; a, J. C. Cochrane; b, O. J. King, of Corning, Iowa....Sycamore, Ill., Queen Anne house; cost $10,000; o, Con. Reuben Ellwood; a, G. D. Randall; b, by the day....Marinette, Wis. br house; cost $5,000; o, Prof. Anerswald; a, J. D. Randall; b, not decided....Marinette, Wis., br house; cost $5,000; o, Dr. M. A. Miller; a, G. D. Randall; b, by the day.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JANUARY 27, 1883

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
North Atlantic Cities.																							
Portland.....Maine	34,519	18	27.0	10	55.5			5															
Boston.....Mass	407,581	170	21.7	54	31.7	8	1	28	2	4	11	3	3		3	16		4		1	3		
Cambridge.....Mass	57,432	20	18.1	8	40.0	1		4			6					3							
Worcester.....Mass	64,995	18	14.3	7	38.8			3										4					
New Haven.....Conn	66,979	31	24.0	6	19.3	1		7	2						1	2		1		1			1
Providence.....R. I.	114,723	48	21.7	12	25.0	2	1	3	2				3			10		3					1
Total	746,229	305	21.2	97	31.4	12	2	50	6	4	17	3	6		4	31		12		2	3		2
Eastern Cities.																							
Albany.....New York	98,430	46	24.3	19	41.3			6	2	1	1		1		3	2		1		1			
New York.....New York	1,299,249	636	25.4	215	33.8	26	5	111	13	9	23	6	5	5	20	72		31		14	10		3
Brooklyn.....New York	633,763	241	19.7	98	40.6	4		29	12	1	14	3	1	5	9	37	2	9		1	3		
*Hudson Co.....New Jersey																							
Newark.....New Jersey	147,744	58	20.4	20	34.4	1		17	4	2		1			5	5	1						
*Camden.....New Jersey																							
Philadelphia.....Pa.	907,043	398	22.8	129	32.4	3	2	63	10		30	2	10	1	8	35	4	8	2			6	2
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	26	28.8	4	15.3			6			2		2									5	
Total	3,133,118	1,405	23.3	485	34.5	34	7	232	41	13	70	12	19	11	45	151	7	49	2	16	13	11	5
Lake Cities.																							
Buffalo.....New York	168,702	66	20.3	26	39.3		1	9	1		5	2	2		3	4	1						1
Rochester.....New York	92,116	30	16.9	5	16.6	3		6			1	1	1	1		2							
Syracuse.....New York	54,696	17	16.1	8	47.0	2				3		1	1			2							
Cleveland.....Ohio	192,084	62	16.7	26	41.9	1		5	2	3	5			1	4	3			1	1	1		1
Detroit.....Michigan	131,118	64	25.4	33	51.5			3	4		10		1	1	8			4					
Chicago.....Illinois	597,834	208	18.0	94	45.1	4	3	16	5	1	11		3	2	5	17	2	16			1	1	1
Milwaukee.....Wisconsin	135,233	45	17.2	23	51.1	2		3	1		1				3	3	2	1			1		
Total	1,371,783	492	18.6	215	43.6	12	4	42	13	7	33	4	8	5	23	31	5	21	1	1	3	1	3
River Cities.																							
Allegheny.....Pa.	89,038	34	19.8	14	41.1	3	1	5	2				2			4					1		1
Pittsburgh.....Pa	191,523	61	16.5	18	29.5	6		10	1		2	1	9			6		1			1	1	2
Cincinnati.....Ohio	267,767	108	20.9	34	31.4	1		14	3	1	3	2	2		3	11		3		4	1		1
*Dayton.....Ohio																							
Louisville.....Ky.	131,529	50	19.7			1		13	1	2		1		1		4						4	
Indianapolis.....Indiana	86,529	29	17.4	10	34.4	1		7		1			5		1	3	1	2					
Terre Haute.....Indiana	30,404	7	11.8	1	14.2			1								1							
Minneapolis.....Minn	98,026	19	10.0	3	15.7			3			1		1			2	1	1			3	2	
*St. Paul.....Minn																							
St. Louis.....Mo.	362,816	182	26.1	63	34.6	6	2	30	6		15		2	2	14	19		13			2		2
Total	1,257,692	490	20.2	143	29.1	18	3	83	13	4	21	4	21	3	18	50	2	20		4	8	7	6
Pacific Cities.																							
San Francisco.....Cal																							
Total																							
Southern Cities.																							
District of Columbia.....Wh.	136,471	36	13.7	8	22.2	3		7			1		1	1	2	1		1					
" " .....Col.	71,103	40	29.2	18	45.0			6			1		2	1	1	9	2	2					
Richmond, Va.....Wh.	38,526	15	20.2	3	20.0		1	1		1			1								1		
" .....Col.	29,894	16	28.3	6	37.5			2						1			1						
Charleston.....S. C.....Wh.	22,699	6	13.7			1		1								4							
" .....Col.	27,595	31	58.3	12	38.7			7						1								2	
Atlanta.....Ga.....Wh.	25,583	7	14.2	2	28.5						1					1						1	1
" .....Col.	19,221	12	32.5	5	41.6	1																	
*Savannah.....Ga.....Wh.																							
" .....Col.																							
Nashville.....Tenn.....Wh.	31,993	13	21.1	4	30.7			2		1	1	1				1						2	
" .....Col.	19,406	5	13.3					3															
Memphis.....Tenn.....Wh.	18,677	25	69.2	6	24.0	1	1	3		4				2		4		1		1			
" .....Col.	14,806	19	66.1	4	21.0			4		1			1	1		7			1				
Mobile.....Ala.....Wh.	16,927	5	15.3	1	20.0	1		2															
" .....Col.	14,368	5	18.0					1															
*New Orleans.....La.....Wh.																							
" " .....Col.																							
Total White	290,876	107	19.1	24	22.4	6	2	16		6	2	1	2	4	2	6		2				4	
Total Colored	195,983	128	34.0	45	35.1	1		23		1	2		3	3	1	21	4	2	1	1	1	1	1
Total in 34 U. S. Cities	6,995,681	2,927	21.8	1,009	34.4	83	18	446	73	25	145	24	59	26	93	290	18	106	4	24	28	24	19
Jan. 13,—Total in 28 English Cities	8,620,975	3,708	22.4			158				32	18		54		77					68		7	107
Jan. 13, " 8 Scotch Cities	1,233,087	637	26.8			18				10	17		7		11					13			44
Jan. 13, " 16 Irish Cities	854,731	496	30.2			9		58		11	1		6		10					9			19
Dec' 23, " 166 German Cities	8,455,290	3,908	24.0	1,727	44.2	80		598	23	118	167		72		81					49	13	2	51

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending Jan. 27 in 34 United States cities, having an aggregate population of 6,995,681 there are reported 2,927 deaths, corresponding to an annual death rate of 21.8 per 1,000, a diminution from the rate of the two preceding weeks, which was 22.4 per 1,000, and less than in any of the groups of foreign cities.

In the North Atlantic cities the rate was 21.2; in the Eastern cities 23.3; in the lake cities 18.6; in the river cities 20.2 and in the Southern cities, for the whites, 19.1 and for the colored 34.0 per 1,000. The rate in the river cities is raised by the comparatively high rate in St. Louis, viz., 26.1

Deaths from small-pox are reported from Philadelphia, Wilmington, Chicago, Pittsburgh, Louisville, Minneapolis and Richmond. The number of deaths from acute lung diseases continues large. Diphtheria is especially prevalent in Philadelphia, Detroit and St. Louis.

NEW YORK CITY, LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports eight admissions, five discharges, four deaths and 1,315 insane patients remaining under treatment.

ATLANTA, GA.—Dr. Jas. B. Baird states that two of the three deaths from small-pox occurred in the hospital outside the city.

PLYMOUTH, MICH.—Dr. C. De Muth reports no deaths as having occurred during the three weeks ending Jan. 20. Population 3,000.

DETROIT, MICH.—Dr. O. W. Wight reports 31 cases of scarlet fever and 23 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 16 cases of scarlet fever and six of diphtheria. The accidental deaths occasioned by the burning of the Newhall House have not been taken up on Dr. Diercks' mortality reports.

LOUISVILLE, KY.—Dr. E. R. Montgomery reports 13 new cases of small-pox; with one exception they were removed to hospital.

PROVIDENCE, R. I.—Dr. E. M. Snow reports a case of small-pox which came on steamer direct from Baltimore.

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BOSTON, MASS.—C. E. Davis, Jr., reports 39 cases of diphtheria 21 of scarlet fever, three of typhoid fever and one of small-pox. On January 25, quarantine inspections of all vessels arriving from Baltimore were ordered.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports only two deaths during the week, one under five years from whooping cough.

SANDWICH, ILL.—Dr. Nahum E. Ballou reports the presence of scarlet fever.

NEWBURYPORT, MASS.—Geo. H. Stevens, city clerk, reports 11 deaths. Two of the decedents were under five years of age. The average age of the nine others was about 62 years.

NEW YORK QUARANTINE.—A case of small-pox arrived from Europe on the Abyssinia on Jan. 14. It was reported as having been isolated on the day succeeding the appearance of the eruption. The passengers were examined at quarantine and 11 vaccinated in addition to those vaccinated by the steamer's surgeon. Dr. W. M. Smith reports that "There are gratifying evidences of an effort to secure re-vaccination among the emigrants before leaving their homes."

BALTIMORE, MD.—For the week ending Jan. 27 there were 252 deaths in this city; males 128, females 124; under five years 105, over 60 years 37. Small-pox caused 75 of the deaths, croup four, diphtheria 18, scarlet fever six, pneumonia 18, bronchitis two and consumption 29.

MICHIGAN.—Dr. Baker's statement gives the following diseases in their order of greatest area of prevalence during the week ending Jan. 20; rheumatism, neuralgia, bronchitis, consumption, tonsilits, intermittents, pneumonia and influenza. Scarlet fever was present at 21 places, diphtheria at 19 and measles at ten places. Small-pox was reported at Royalton, Berrien Co. (three cases), on Jan. 17. "Since the close of the week there has been a remarkably low temperature and a considerable increase in ozone. Judging from past experience we may predict a probable increase in influenza, which disease has sometimes preceded cerebro-spinal meningitis."

CALIFORNIA.—The Monthly Circular of the State Board of Health, for Dec. 1882, gives the mortality statistics of 22 cities and towns, aggregating a population of 402,511. The deaths numbered 678, corresponding to an annual rate of 20.16 per 1,000. Consumption caused 110, pneumonia 53, bronchitis 14, diarrhœal diseases 19, diphtheria 22, croup three, measles one, typhoid fever 40, malarial fevers 12 and cerebro-spinal fever two. No deaths are recorded from whooping-cough, scarlet fever or small-pox. "Although not strictly belonging to the month of December, but rather to the early part of the present month, January, 1883, it is proper to give timely notice of the occurrence of a few cases of small-pox at Red Bluff. Strict measures have been taken by the authorities, a supply of vaccine obtained, and there is thought to be but little danger of its extending. It is well, however, to be prepared for any emergency, and to urge upon the unprotected everywhere, a resort to the only prophylactic known to medical science."

ERIE, PA.—The Annual Report for 1882, of Dr. E. W. Germer, Health Officer, shows 499 deaths, males 259, females 240; under five years 184, over 60 years 80; estimated population 30,000 to 32,000. Death rate about 16 per 1,000. Causes of death: consumption 64, diarrhœa 44, diphtheria 31, convulsions 40, pneumonia 28, typhoid fever 20, malarial fever nine, puerperal fever eight, small-pox 12, croup nine, whooping-cough seven, erysipelas three. About 68 cases of small-pox were treated during the year. At one time it seemed as if the disease would assume epidemic proportions, but energetic measures prevailed against it.

Dr. Germer enters a plea for a tenement ordinance. "Unfortunately," he says, "in our city, a great many dwellings overfilled with people, are nothing but breeding places for all kinds of disease. Such people pay generally a big rent and are bound to stay by a tight lease. I had five cases of small-pox in one house, and as the landlord refused to procure city water, the people had to get their water from the neighbors, and thus expose them."

JACKSONVILLE, FLA.—Dr. A. W. Knight, sends the semi-annual return of mortality for the last six months of the year 1882. Population 10,000; whites 6,000, colored 4,000; total deaths 80, white 40, colored 40; under five years 34; annual rate, white 13.2, colored

(Continued on page 230.)

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OFFICIAL REPORTS OF MORTALITY FOR THE MONTH OF DECEMBER, 1882.

CITIES.	STATES.	Total Population.	Total Number of Deaths.	Representing an Annual Death rate per 1,000 of—	Males.	Females.	Number of Deaths under Five years.	Number of Deaths over Sixty years.	Accidents.	Cerebro-Spinal Meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal Diseases.	Small-Pox.	Whooping-cough.	REPORTER.
Boston	Mass	410,376	771	22.50	384	387	247	144	26	2	147	17	9	77	6	14	....	10	76	....	47	1	5	11	....	1	Dr. S. H. Durgin.
Chicago	Ill	560,693	932	19.95	514	418	373	112	68	6	94	21	8	56	7	38	4	29	78	6	36	1	...	20	16	1	" O. C. DeWolf.
Detroit	Mich	130,000	230	20.83	117	113	97	36	3	..	19	13	1	37	1	5	4	19	16	....	7	1	...	3	....	1	" O. W. Wight.
District of Columbia	White	124,710	183	17.61	98	85	106	59	10	....	20	2	2	8	..	2	5	9	18	4	4	....	1	4	1	1	" S. Townshend.
" "	Colored	64,421	137	25.52	69	68			5	....	44	....	3	1	....	....	2	1	15	7	7	....	....	1	....	1	
Hudson Co.	N. J.	398,711	427	25.70	....	....	188	57	19	1	41	22	3	21	....	8	2	16	65	6	24	...	8	1	....	3	C. J. Rooney, Jr.
Keokuk	Iowa	15,000	10	8.00	6	4	5	1	....	...	1	1	1	....	....	1	....	1	....	1	....	....	....	....	....	....	Dr. Geo. F. Jenkins.
Knoxville	Tenn. White	12,643	31	29.42	21	10	12	1	....	...	5	1	....	3	....	2	....	3	3	1	1	...	2	....	1	..	" S. B. Boyd.
"	" Colored	4,508	13	34.60	4	9	1	....	1	....	....	....	....	1	....	....	....	1	....	2	....	....	....	....	4	....	
Lowell	Mass	59,475	107	21.60	....	....	33	....	1	....	23	2	1	2	3	5	....	2	13	1	4	...	....	....	....	....	Board of Health.
Macon	Ga White	9,000	11	14.66	4	7	1	1	....	....	1	....	....	....	....	....	....	....	3	....	....	....	....	....	....	....	Dr. J. E. Blackshear.
"	" Colored	8,000	13	16.23	7	6	....	2	1	....	1	....	....	....	....	....	....	....	3	....	....	..	....	....	....	....	
Milwaukee	Wis	125,000	223	21.40	124	99	108	36	8	2	16	12	3	13	2	4	....	5	24	2	11	....	....	3	....	....	" R. Martin.
Minneapolis	Minn	80,000	102	16.30	59	43	36	2	7	1	9	1	...	13	1	5	....	3	21	1	1	....	1	1	5	....	" J. C. Cockburn,
Mobile	Ala. White	16,927	30	21.24	11	19	19	15	1	....	3	....	....	1	...	2	...	....	..	1	1	....	....	....	....	....	" E. H. Fournier.
"	" Colored	14,368	38	31.68	23	15			2	....	6	2	....	....	....	1	....	....	2	1	....	....	....	....	....	....	
Nashville	Tenn. White	29,000	42	17.22	25	17	12	21	1	....	5	2	1	....	....	....	2	3	5	1	1	....	....	....	4	....	" R. Cheatham.
"	" Colored	16,000	49	36.75	20	29	17		2	....	10	2	2	....	....	....	1	1	5	1	....	....	....	..	....	....	
Norfolk	Va White	12,546	17	16.32	12	5	6	4	....	....	1	1	..	1	...	...	3	..	3	....	....	....	....	....	....	....	" Jas. D. Galt.
"	" Colored	10,454	36	41.28	17	19	11	6	1	....	5	...	1	....	..	....	2	....	7	1	1	1	....	....	....	2	
Oakland	Cal	36,000	39	13.00	21	18	11	10	2	....	8	...	....	1	....	2	3	....	4	....	1	....	....	....	....	....	" J. R. Bradway.
Paterson	N. J.	55,000	112	28.43	59	53	44	17	2	...	17	3	1	....	....	....	....	1		22			...	....	2	....	" Geo. Boyd.
Petersburg	Va White	10,000	16	19.20	7	9	4	5	....	....	1	....	....	....	....	....	....	....	4	2	...	....	....	....	....	..	" T. S. Schwank.
"	" Colored	12,000	38	38.00	20	18	13	3	3	....	9	2	2	..	....	....	....	....	6	....	1	....	....	..	....	....	
Providence	R. I.	111,913	215	23.05	101	114	54	48	7	2	31	3	3	13	1	28	.	3	8	2	7	1	3	4	....	2	" E. M. Snow.
Richmond	Va White	40,000	4[illegible]	14 40	22	26	38	22	1	....	12	1	1	1	....	2	...	2	4	...	....	....	..	....	....	2	" J. G. Cabell.
"	" Colored	28,000	84	36.00	45	39			6	....	15	2	1	....	...	1	....	....	6	1	....	....	....	1	....	2	
Rochester	N. Y.	100,000	135	15.90	69	66	32	32	7	1	17	....	....	20	1	5	4	3	5	3	1	1	....	....	....	1	" W. F. Sheehan.
Scranton	Pa	45,850	47	12.24	27	20	14	13	8	....	4	2	1	1	1	1	....	2	9	....	1	..	....	....	....	....	" T. P. O'Malley.
St. Paul	Minn	53,683	101	22.80	62	39	44	7	3	....	6	6	1	23	....	6	1	....	3	1	6	1	....	....	....	....	" C. A. Wheaton.
Toledo	Ohio	60,000	49	9.80	24	25	17	7	6	....	7	3	...	7	....	2	....	....	4	....	3	....	1	....	....	....	" C. L. VanPelt.
Wilmington	Del	50,000	82	19.06	....	....	28	14	....	....	14	3	....	1	....	5	.	1	5	1	2	1	....	1	....	....	" E. B. Fraser.

20.0. Accidents caused four deaths, consumption seven, diarrhœal diseases four, diphtheria three, typhoid fever three, malarial fevers eight, puerperal fever one, and pneumonia one. No deaths from scarlet fever, measles, whooping-cough, croup or small-pox.

ONTARIO, CANADA.—The Provincial Health Bulletin for the week ending Jan. 20 shows the prevailing diseases in the following order: neuralgia, bronchitis, rheumatism, influenza, anæmia, tonsilitis, pneumonia and consumption.

Varicella is reported from several widely separated districts and is regarded as premonitory of small-pox.

AUX CAYES, HAYTI.—Consular Agent Dutton reports the small-pox as disappearing. Only one death occurred from this disease during the two weeks ending Dec. 30.

HAVANA, CUBA.—Dr. D. W. Burgess reports two deaths from yellow fever during the week ending Jan. 19. There are ten cases under treatment in the city and in the military hospital.

ST. HELENA (ISLAND OF).—Consul Jas. A. McKnight reports under date of Dec. 31, that the island has been under quarantine since the middle of July last owing to small-pox at the Cape and on the African coast, but though vessels bearing the infection have anchored in the roads, no case of contagious disease has appeared on the island.

BUENOS AYRES, ARGENTINE REPUBLIC.—The monthly *Bulletin of Hygiene* for November shows the number of deaths to have been 508 in a population of 177,787. Deaths under five years 308; over 60 years 33. Small-pox caused 64 deaths.

ENGLAND.—The return of the Registrar General for the week ending Jan. 13, shows an average rate of 22.4 in the 28 principal towns Derby gave the lowest rate 9.1, and Liverpool the highest, 33.7. Small-pox caused seven deaths in London but not one in any of the 27 large provincial towns. A general summary of the returns is given in our statistical table.

In London 2,808 births and 1,567 deaths were registered. Allowing for increased population the former exceeded by 22, whereas the latter were 213 below the average numbers in the corresponding weeks of the last ten years. The deaths included seven from small-pox, 46 from measles, 31 from scarlet fever, 14 from diphtheria, 29 from whooping cough, 12 from typhoid fever, 12 from diarrhœal diseases; 32 new cases of small-pox were admitted into the hospital during the week, making 99 remaining under treatment. The deaths from diseases of the respiratory organs were 129 below the corrected weekly average.

SCOTLAND.—During the month of December there were registered in the eight principal towns the births of 3,444 children of whom 1,795 were males and 1,649 females. The deaths numbered 3,001; males 1,469, females 1,532. This number is 85 above the average for December during the last ten years, making due allowance for increase of population. Of the decedents 1,175 were under five years of age. Whooping cough was the most fatal epidemic, having caused 153 deaths, or 5.1 per cent. of the whole mortality. Fever caused 62 deaths of which 17 were tabulated as typhus. Scarlet fever caused 84 deaths, measles 53, croup 41, diarrhœa 40, diphtheria 29, consumption 257, or 8.6 per cent., and acute diseases of the respiratory system 864, or 28.8 per cent.

The return for the week ending Jan. 13 gives 26.8 as the rate in the eight principle towns. The lowest mortality was recorded in Leith, 17.6, and the highest in Greenock, 34.2 per thousand. In Edinburgh the rate was 17.8. No deaths from small-pox were registered.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the registrar general for the week ending Jan. 13. In Dublin the rate was 29.3, and in Belfast 30.1. For summary see table given above.

PARIS, FRANCE.—During the week ending Jan. 11 there were 1,122 deaths, corresponding to an annual rate of 26.03. Of these 610 were males and 512 females; 310 under five years, and 234 over 60 years. Typhoid fever caused 69 deaths, and small-pox six, measles 28, scarlet fever none, whooping cough two, croup and diphtheria 42, dysentery two, erysipelas 11, puerperal fever three, consumption 208, acute bronchitis 42, pneumonia 69, and violence 47 deaths. On Jan. 7 there were 78 csses of small-pox, 672 of typhoid fever, and 30 of diphtheria under treatment in the hospitals. The number of new cases of typhoid fever has diminished considerably. For the first time in five months it has fallen below 100. Measles, on the contrary, are increasing. The deaths from this cause during the week have been as numerous as in July, 1882, when the disease was considered epidemic. The births during the week numbered 1,365.

RHEIMO, FRANCE.—During the week ending Jan. 6 there were 49 births and 56 deaths in a population of 93,823. Typhoid fever caused seven deaths, bronchitis six, pneumonia seven, pleurisy seven, consumption eight, and diphtheria two. No deaths were reported as caused by measles, scarlet fever, whooping cough or small-pox.

BORDEAUX, FRANCE.—Consul Geo. W. Roosevelt transmits the monthly bulletin for Dec. 1882, showing the occurrence of 454 deaths in a population of 221,308. No deaths are recorded from small-pox or scarlet fever. Measles caused one death, typhoid fever 17, croup six, whooping cough two, puerperal fever seven, dysentery four, bronchitis 11, pulmonary catarrh 23, pneumonia and pleurisy 38, consumption 69, and violence 14; 94 of the deaths occurred in persons over 70 years of age. Mr. Roosevelt reports the city as in good sanitary condition.

STOCKHOLM, SWEDEN.—Consul Elpwing reports 108 deaths for the week ending Dec. 30. Males 60, females 48; under five years, males 20, females 19, total 39; over 60 years, males 8, females 8, total 16. Annual rate per 1,000, 32.1. Measles caused three deaths, scarlet fever five, whooping cough three, diphtheria four, bronchitis seven, pneumonia 21, consumption 14, diarrhœa six, and accidents three deaths.

ROTTERDAM, NETHERLANDS.—Consul Jno. F. Winter reports 16 cases of small-pox, two of which were fatal, during the week ending Jan. 6.

BRUSSELS, BELGIUM.—During the week ending Jan. 6 there were 261 births and 175 deaths in the city and its suburbs, corresponding to annual rates of 33.8 and 22.6, respectively. 62 of the decedents were under five years of age. Small-pox caused two deaths, measles one, scarlet fever none, typhoid fever three, diphtheria one, croup none, whooping cough two, diarrhœal diseases 14, bronchitis and pneumonia 26, and consumption 33.

COPENHAGEN, DENMARK.—During the week ending Dec. 26, there were 99 deaths; under five years, 43; over 60 years, 24. Scarlet fever caused two deaths, diphtheria one, whooping cough two, typhoid fever two, diarrhœal diseases three, puerperal fever two, erysipelas one, consumption 14, pneumonia seven, bronchitis 11. Cases of epidemic diseases were reported as follow: Measles seven, scarlet fever 34, diphtheria 10, whooping cough 34, typhoid fever three, diarrhœa 81, erysipelas 26, puerperal fever three, bronchial catarrh 308, pneumonia 65, tonsilitis 100.

During the week ending Jan. 2 there were 153 deaths; under five years, 76; over 60 years, 29. Measles, scarlet fever, diphtheria, and croup each caused two deaths; whooping cough four, diarrhœa six, pneumonia 12, bronchitis nine, consumption 17. Cases were reported as follows: Measles nine, scarlet fever 28, diphtheria 13, whooping cough 44, typhoid fever two, diarrhœa 89, erysipelas 22, puerperal fever two, bronchial catarrh 363, pneumonia 43, and tonsilitis 123.

VIENNA, AUSTRIA.—Consul General Weaver reports 381 deaths during the week ending Jan. 6, in a population of 749,762, which is equal to an annual rate of 26.4 per 1,000. Consumption caused 91 deaths, acute lung diseases 68, small-pox four, and scarlet fever, diphtheria, and whooping cough three deaths each.

WARSAW, RUSSIAN POLAND.—Consul Rawicz sends reports for the weeks ending Dec. 23 and 30, showing, respectively, 264 and 218 deaths in a population of 383,973. Small-pox caused five deaths during the two weeks.

BOMBAY, INDIA.—Consul B. F. Farnham sends reports for the three weeks ending December 12, 19 and 26:

December 12. Deaths 416, or 58 less than the mean of the corresponding period in the past five years. Annual rate 25.89. There were 69 deaths from remittent fever, 66 from diseases of the respiratory system, 19 from diarrhœa and seven from dysentery.

December 19. Deaths 422, or 51 less than the mean of the corresponding week in the previous five years. Annual rate 26.29. Remittents caused 72 deaths, diseases of the respiratory system 67, diarrhœa 22, and dysentery 15.

December 26. Deaths 397, or 94 less than during the week ending December 27, 1881, and 83 less than the mean of the corresponding week of the past five years. Annual rate 25.01. Deaths from remittent fever 63, from diseases of respiratory system 64, from diarrhœa 16, and from dysentery 13.

SINGAPORE, INDIA.—Consul A. G. Studer transmits the report of the Registar General for November. 380 deaths took place of which five only are recorded as having occurred among Europeans. Fever caused 98 deaths, convulsions 33, diarrhœa 27, consumption 60, dysentery seven, beri-beri six, leprosy six and small-pox five.

BRISBANE, NEW SOUTH WALES.—During the month of October, 111 births were registered, males 59, females 52, and 99 deaths, 51 males, 48 females, in a population of 33,068. Of the decedents 57 were under five years, or 57.58 of the total mortality. Zymotic diseases caused 40 of the deaths.

MELBOURNE, AUSTRALIA.—In the city and suburbs, embracing a radius of ten miles and a population of 284,874, there were in October 759 births, males 396, females 363, and 397 deaths, males 241, females 156, the excess of births over deaths being 362. To every 1,000 of the population of the district the proportion of births registered was 2.66 and of deaths 1.39 for the month. The deaths of 20 persons of the age of 75 years or upwards were recorded during the month. The deaths under five years numbered 124, males 82, females 42. Scarlet fever caused two of the deaths, diphtheria one, croup one, typhoid fever 11, diarrhœa and dysentery nine, consumption 49, bronchitis 25, pleurisy five, pneumonia 26, congestion of lungs ten, and violence 26. The zymotic death-rate was low during the month.

TYPHUS FEVER IN THIS CITY.

The following is a brief history, up to Saturday of last week, of the recent cases of typhus fever in this city.

The first was that of a girl about thirteen years old, living in the rear house at No. 169 Hester street. It is a filthy tenement house, and the disease is believed to have originated there. The girl was taken sick Dec. 9, and seven days later (Dec. 16) was taken by friends into the front house at the same number. She had no physician, and was convalescent on the 15th day.

The second case was that of one of the young women who took care of the first case after she was moved into the front house. She was taken December 26, and died at the house on the 14th day.

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The third was a young woman, sister of the first, who was taken sick December 28; was sent to Bellevue Hospital, as a typhoid case, January 8, to the Reception Hospital, January 11, and to Riverside (contagious diseases) Hospital, January 13. She was convalescent on the 16th day.

The fourth, a girl, and sister of the second, who assisted in the care of the first, was taken Dec. 28, the same day as the preceding. She was removed, January 10, to Bellevue, and to Riverside, Jan. 13; was convalescent on the 23d day.

The fifth was a girl, a sister of the first and fourth, living in the same house. She was taken January 2, and removed direct to Riverside January 8, and was convalescent on the 14th day.

The sixth was a young woman, attendant at Bellevue, who nursed one of the typhus patients there as a case of typhoid. She was taken Jan. 21, and transferred to Riverside, January 27.

The eighth and last case (up to the 3d inst.), was another young woman, attendant at Bellevue, who was taken soon after the last and removed to Riverside.

The ward in Bellevue where the typhus patient was while there, is under quarantine, no new patients being admitted, and a special isolation-room provided for suspected new cases developing there. The tenement house and the factory where the first case worked, is kept under constant watch, and it is hoped the disease will gain no further advance.

Charles E. Fowler, City Engineer of New Haven, Ct., died Jan. 28, of erysipelas, in the 41st year of his age.

The Hon. Ezra Parmenter, M.D., of Cambridge, a member of the State Board of Health, Lunacy and Charity, of Massachusetts, and the representative of Cambridge on the bridge commission, died at his residence, No. 37 Second street, East Cambridge, Jan. 30, in the 59th year of his age. When the Board of Health, Lunacy and Charity was established in 1879, Governor Talbot appointed Dr. Parmenter as one of the members, and on the expiration of his term last year he was reappointed by Governor Long.

Health Commissioner DeWolf, of Chicago, calls attention to the fact that children working in factories have no fit place to eat their luncheon in, but have to go down into the basements under the sidewalks near the water closets.

Col. Emmons Clark, Secretary of the New York City Board of Health, has sent, in a letter to Hon. D. B. Hill, President of the Senate, the resolutions of the Board of Health objecting to the bill for preventing the manufacture of cigars in tenement houses. The Board states that the health of the tenement house population is not jeopardized by the manufacture of cigars; that the bill is not a sanitary measure, and that it has never been approved by this Board.

A case is reported from Cleveland, O., where the coloring matter of a black stocking got into a wound, made by chafing, and caused serious poisoning of foot and leg.

In a lecture before the Franklin Institute the 22nd ult., Mr. C. H. Roney, C. E., showed the evil results of making use of the old rain water culverts to carry off the sewage, and the remedies suggested were illustrated by a number of designs. Tables showing the comparative death-rate of the principal cities of the world were exhibited, the influence of defective sewerage arrangements upon the death-rate was dilated upon, and the best mode of remedying the present defective systems described.

An ancient aqueduct has been discovered at Posilippo, during the excavation of a tramway tunnel. It is sufficiently lofty for persons to stand upright and walk along it. The walls are lined with thick cement, and they contain inscriptions concerning the villas supplied with water. One of the inscriptions records a partial restoration of the aqueduct.—*London Architect.*

INTERNATIONAL MEDICAL CONGRESS.

The Secretary-General of the International Medical Congress announces that the eighth session of that body will be held in Copenhagen the 10th to the 16th of August, 1884.

A MUNICIPAL MUSEUM OF HYGIENE AT PARIS.

"At a recent meeting of the Municipal Council of Paris, M. M. Bourneville, Cernesson and Loisean, made the proposition that, as the objects shown by the city of Paris, at the recent Hygienic exhibition at Geneva, excited in all the visitors to that meeting considerable interest, and aroused their attention, it is desirable that these sanitary objects should be exhibited in the pavilion belonging to the city of Paris, in the Champs Elysées; that they should be completed by the addition of plans of schools, hospitals, baths, hydrotherapeutic appliances, etc., recently agreed on by the Municipal Council; and that the municipal authorities should seek for a permanent receptacle to contain the different objects, so as to create a municipal museum of hygiene.

"It is probable that, if the Parisians were not at the present time much taken up with that special form of socialism, which thinks to solve every economic problem by the heroic and wide-spread application of nitro-glycerine and dynamite, they would take up these propositions with the warmth they deserve. The sanitary questions, to which the propositions of M. Bourneville and his colleagues refer, are of considerable importance to the welfare of the masses, and are a direct outcome of that science of hygiene which has been so well defined by Paul Bert, as "social morality" (*la moralité des societés*). The utility of such an organization for Paris is incontestable, especially if it were followed up by public health legislation, more or less on the English, German and Swiss lines. It would then be easy to pass the law for the improvement of unhealthy dwellings drafted by M. Martin Nadand; and that for the sanitary inspection of factories which is under the charge of M. M. Nadand and F. Faure. Great services would also be rendered to Paris by the creation of a central sanitary authority, kept well informed on sanitary matters by subsidiary health committees, such as already exist at Brussels and Turin, and in France itself, at Nancy, Rheims and Havre. The true value of such a system would be brought home to the great body of the Parisians, by the establishment of the museum desired by the gentlemen whom we have already designated, similar in design to our Parkes Museum, and the proposed sanitary museum at Washington, United States of America."—*British Medical Jonrnal.*

The publisher of THE SANITARY ENGINEER will esteem it a favor if names of persons likely to be interested in the journal are sent to him, in order that he may send them specimen copies.

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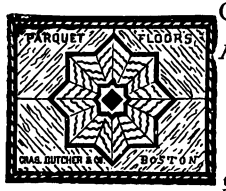

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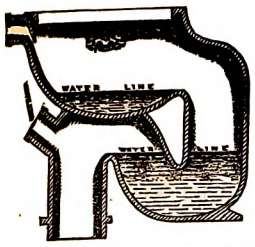

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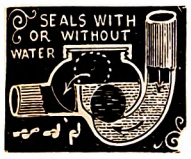

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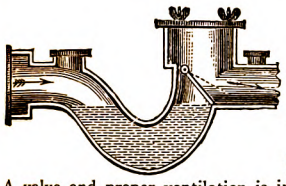

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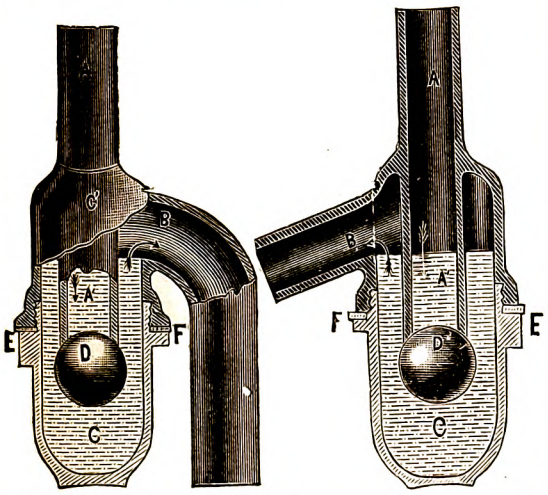

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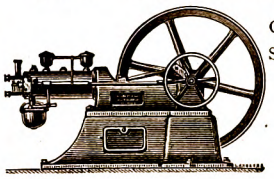

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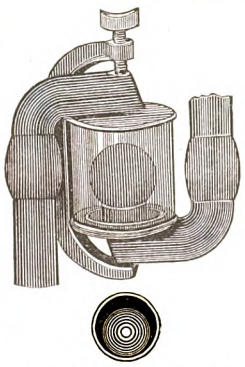

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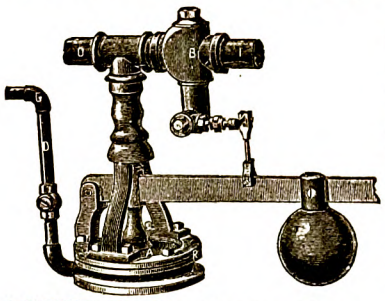

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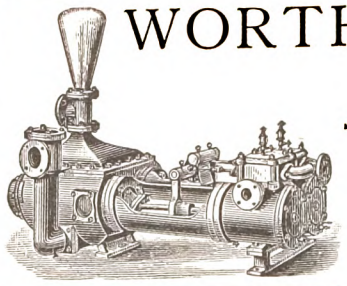

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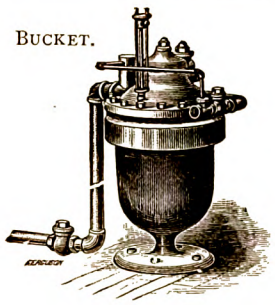

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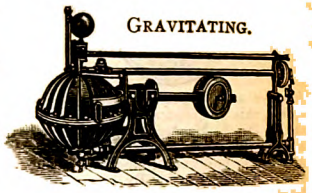

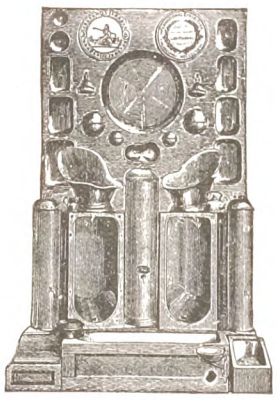

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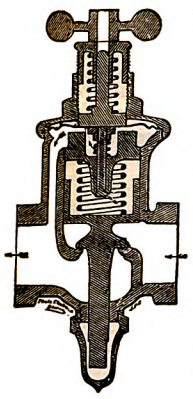

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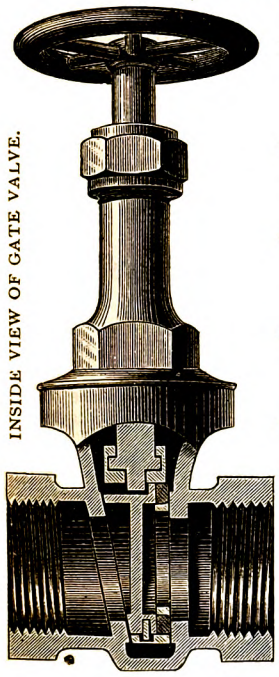

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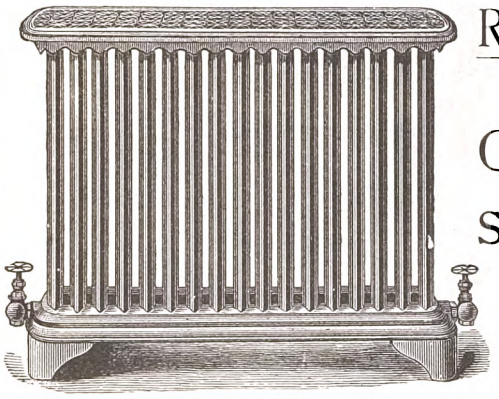

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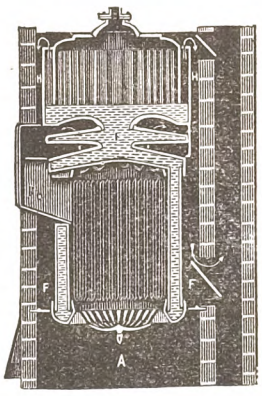

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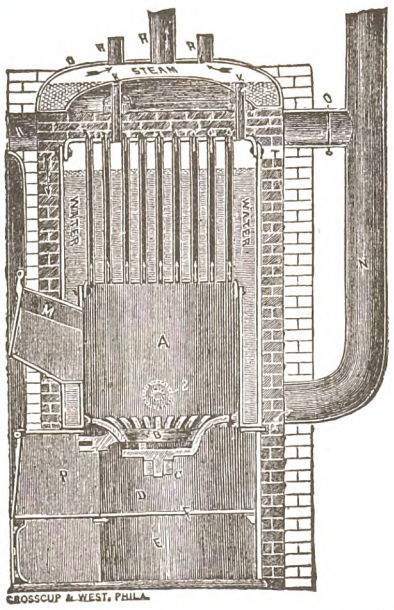

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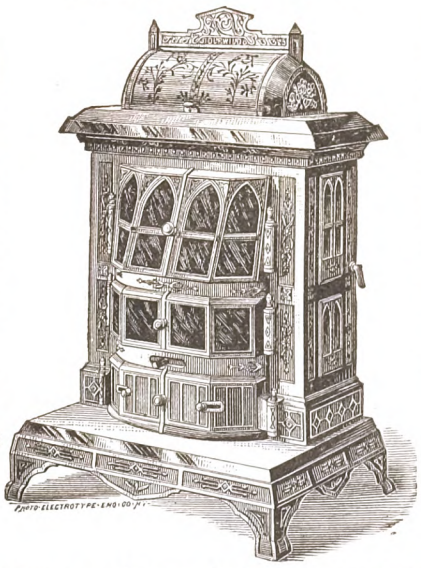

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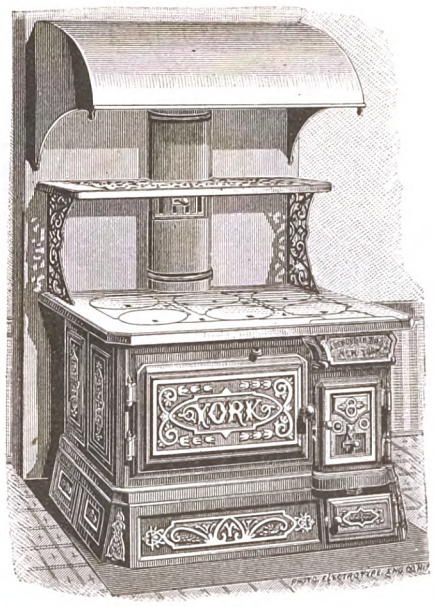

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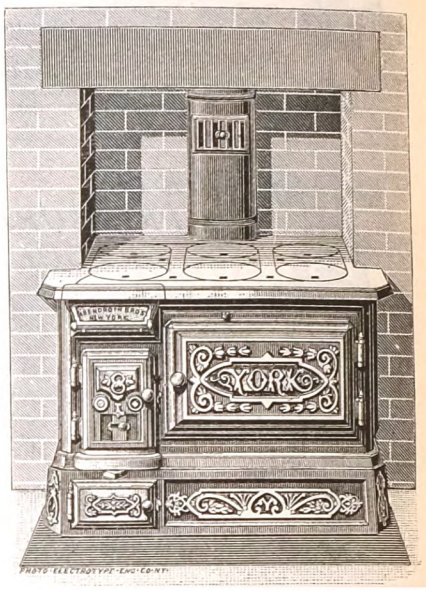

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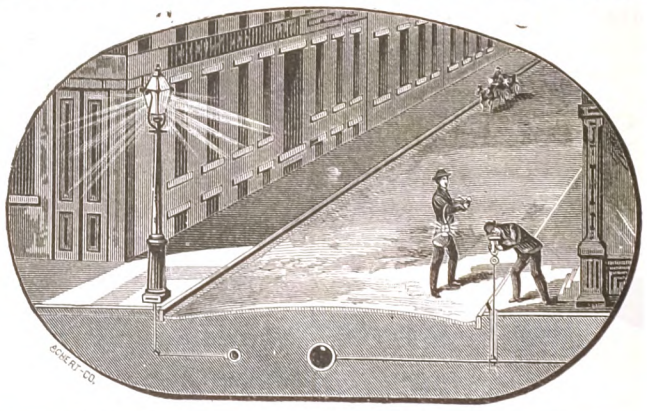

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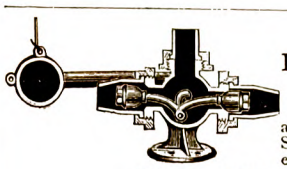

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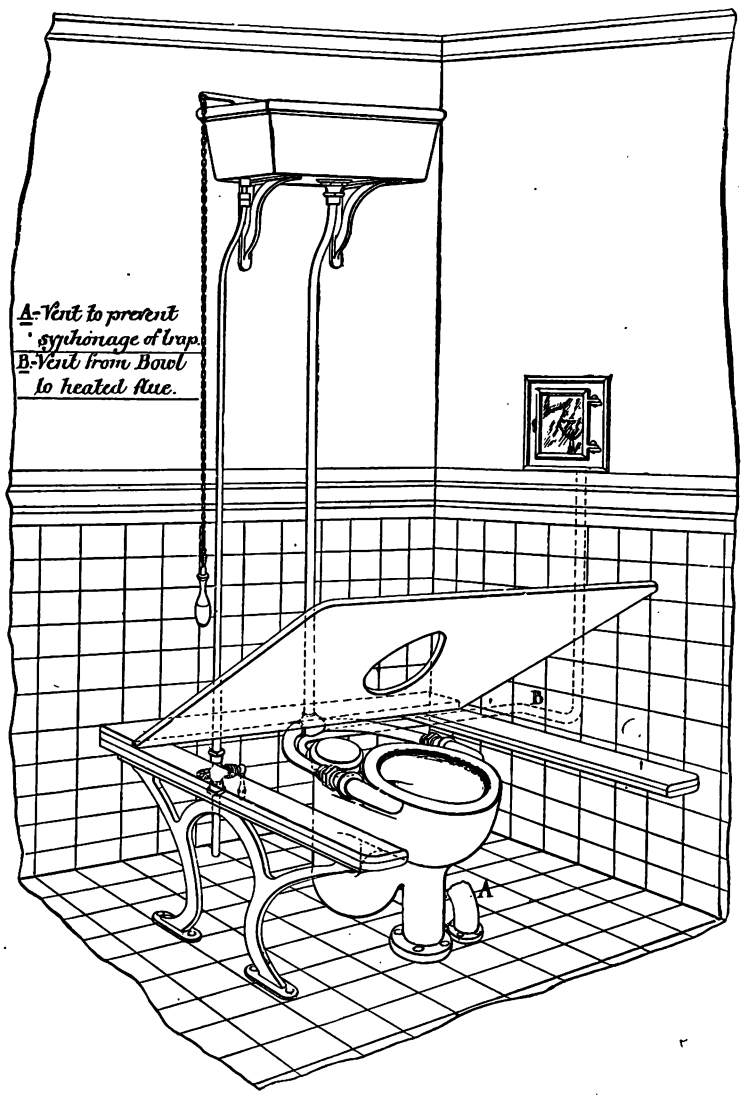

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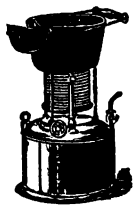

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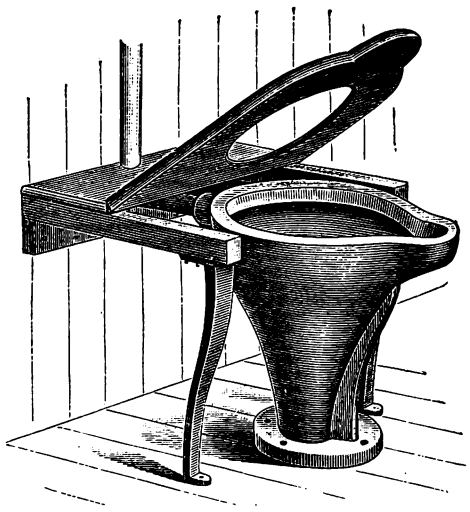

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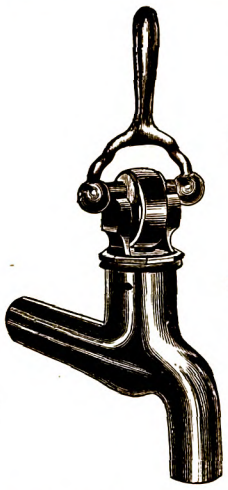

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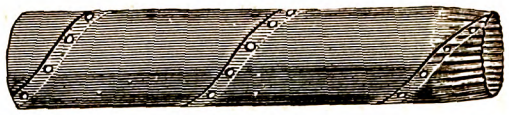

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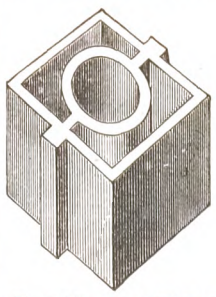

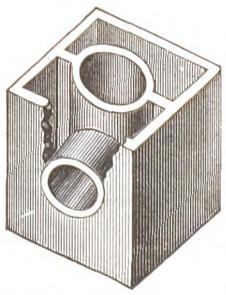

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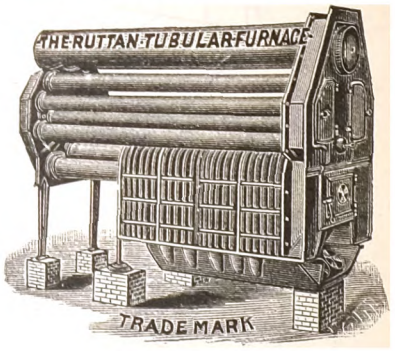

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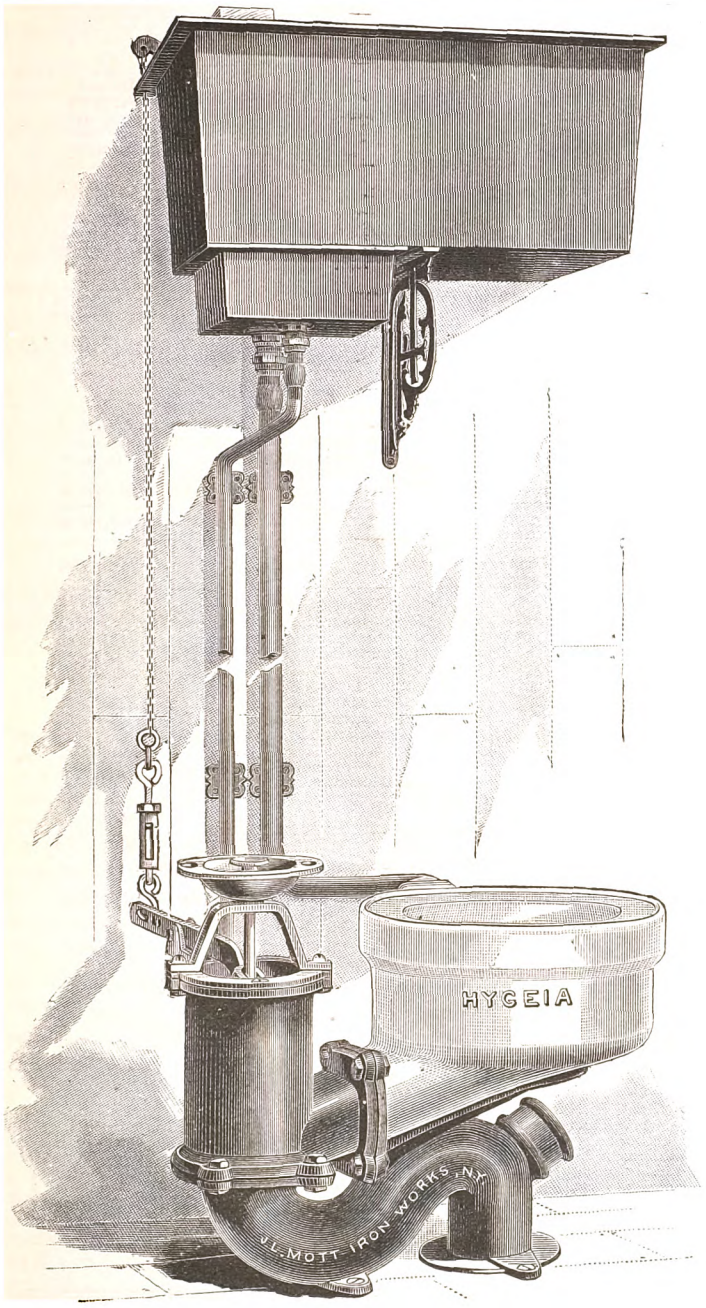

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THE MUTUAL LIFE INSURANCE COMPANY OF NEW YORK

F. S. WINSTON, President.

For the year ending December 31st, 1882.

ASSETS ..... **$97,961,317.72.**

Annuity Account.

	No.	Ann. Pay'ts.		No.	Ann. Pay'ts.
Annuities in force, Jan. 1st, 1882.	58	$21,139 81	Annuities in force, Jan. 1st, 1883.	55	$19,200 91
Premium Annuities.....		4,338 20	Premium Annuities.....		3,712 44
Annuities Issued.....	2	480 68	Annuities Terminated.....	5	3,045 34
	60	$25,958 69		60	$25,958 69

Insurance Account.

	No.	Amount.		No.	Amount.
Policies in force, Jan. 1st, 1882.	101,490	$315,900,137	Policies in force, Jan. 1st, 1883.	106,214	$329,554,174
Risks Assumed.....	11,416	37,234,458	Risks Terminated.....	6,692	23,580,421
	112,906	$353,134,595		112,906	$353,134,595

Revenue Account.

Dr.		*Cr.*	
To Balance from last account.....	$89,618,413 97	By paid Death Claims.....	$4,743,153 40
" Premiums received.....	12,845,592 86	" " Matured Endowments.....	1,288,759 80
" Interest and Rents.....	5,078,765 79	Total claims— $6,031,913 20	
		" " Annuities.....	24,046 55
		" " Dividends.....	3,139,320 83
		" " Surrendered Policies and Additions.....	3,653,554 66
		Total paid Policy-holders— $12,848,835 24	
		" " Commissions (payment of current and extinguishment of future).....	842,322 91
		" " Contingent Guarantee Acc't.	29,703 77
		" " Taxes and Assessments.....	243,059 06
		" " Expenses.....	79[illegible],865 56
		" " Balance to New Account....	92,782,986 08
	$107,542,772 62		$107,542,772 62

Balance Sheet.

Dr.		*Cr.*	
To Reserve at four per cent.....	$92,469,059 00	By Bonds Secured by Mortgages on Real Estate.....	$47,350,317 82
" Claims by death not yet due.....	850,120 00	" United States and other Bonds....	20,618,635 00
" Premiums paid in advance.....	19,795 55	" Loans on Collaterals.....	17,099,960 00
" Agents' Balances.....	10,928 31	" Real Estate.....	7,851,516 39
" Surplus and Contingent Guarantee Fund.....	4,611,414 86	" Cash in Banks and Trust Companies at interest.....	2,729,386 87
		" Interest accrued.....	1,236,731 63
		" Premiums deferred, quarterly and semi-annual.....	959,242 61
		" Premiums in transit, principally for December.....	115,527 40
	$97,961,317 72		$97,961,317 72

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MEMPHIS AND SEWER GAS.

On the 24th of January last the New York *Times* contained an editorial taking the ground that the large mortality in Memphis is due to the sewers, and that while these sewers have been well built, under skilled supervision, and connected with the most approved house appliances, their introduction has been followed by an apparently consequent increase of the ratio of mortality, and in particular that the deaths from dysentery have doubled and those from diphtheria have more than quadrupled. The writer concludes:

"It would really seem as if they are right who contend that no ingenuity of trap, valve, or ventilation, no matter how carefully executed in every detail, can prevent the percolation of noxious gases into a dwelling house that is directly connected with sewage mains. It is an assured fact that since the attention of sanitary engineers has been especially directed to this subject in this city (New York), tracing back the agitation for the last three years, there has been a steady increase in the annual ratio of mortality. There have been no great epidemics to account for this fact, tenement and apartment houses have been steadily improving in sanitary provisions, the streets have been kept cleaner than before, our recent structures have comprised all the requisites of good plumbing and good engineering, and yet, as in Memphis, dysentery and diphtheria have obstinately persisted in strengthening their hold. Until the present system of direct connection (of our sleeping rooms with the sewage mains) was adopted, diphtheria was infrequent and dysentery a rare disease, and it is fair to infer that their recent prevalence is in some manner due to the latter mode of building."

The publication in a leading New York daily of an editorial based so largely on erroneous information and a vivid imagination as this is, is unfortunate. In this particular case the high character of the journal in which these statements appeared secured for them a recognition they did not deserve, and in several instances within our knowledge they have been quoted and used as arguments against the adoption of a sewerage system in communities where this question was under consideration. The author of this paper evidently could not have seen any of the annual mortality statistics of Memphis; he did not know whether diphtheria prevailed there or not; he did not know who supervised the construction of the sewers, but he proceeded, out of the depths of his inner consciousness, to inform the public on all these points.

The majority of our readers are, no doubt, somewhat familiar with the facts about the Memphis sewerage, that the first part of it was constructed under the supervision of Col. Waring, Major Benyaurd having had nothing to do with it, and that the high mortality of Memphis is due to impure water, damp cellars and basements, and to the peculiarities of its negro population.

The following figures are furnished by Dr. Thornton, the Health Officer of Memphis:

AN ANALYSIS OF THE MORTALITY RECORDS OF THE HEALTH OFFICE OF MEMPHIS.

DISEASES.	1875	1876	1877	1878	1879	1880	1881	1882
Malarial fevers	127	99	121	126	68	19	22	17
Typhoid fevers	19	8	14	10	7	17	17	11
Typho-malarial fevers	4	29	27	9	11	22	28	30
Erysipelas	6	1	6	1	12	3	9	5
Dysentery	66	79	63	30	25	45	77	11
Diarrhœa	30	67	61	46	36	49	68	41
Cholera infantum	52	21	31	19	32	11	19	19
Scarlet fever	1	49	17	1	..	13	2	..
Diphtheria	5	8	13	11	1	5	37	9
Croup	13	4	5	6	11	7	11	6
Pneumonia	88	87	108	83	136	89	79	53
Consumption	172	159	180	176	143	155	171	153
All other diseases of lungs	18	25	28	29	26	15	26	34

It is very evident from the above table that there has been no increase in the mortality rate in Memphis which can be charged to the sewerage. The sewers were constructed in 1880-81, and when we consider the increase in population occurring during these eight years, the mortality from the principal zymotic diseases has not increased. There was an epidemic of diphtheria in 1881, but that this was not due to the sewers is shown by the fact that in 1882 the mortality from this cause was less than it was in 1877 or 1878.

The causes of the high mortality in Memphis have been shown by Dr. Thornton to be connected chiefly with the negro population, and his paper on this subject will be found in THE SANITARY ENGINEER for November 16, 1882, p. 516.

NEW YORK'S WATER SUPPLY.

No. IV.

THE SUPPRESSION OF WASTE.

In 1875 Mr. Gale, the Water Engineer of Glasgow, stated that in that city, as the result of many years inspection, he found one tap wasting water for every eight taps examined. As the average number of taps in a house was three, he held that every third house was wasting water. Following this line of reasoning, about every house in this city is wasting water, more or less, during the twenty-four hours, since, instead of three taps per house, in New York the average is not less than twelve.

He very strongly urged the improvement of defective fittings, and after admitting the advantages of district meters and appliances for indicating where waste was going on, he yet held that the removal of imperfect fittings was the

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only possible solution of this difficult question, and "he did not anticipate any improvement in this direction until the authorities instituted a system of testing and stamping of every fitting before it was allowed to be used, which had been so long successfully carried out in Manchester." It will be remembered this was stated prior to the enforcement of the rules which secured the gratifying results reported in our last article. In referring thus at length to Glasgow, we do so because our condition now is much the same as theirs was in 1875, and the remarks of Mr. Gale apply with special force to us today, especially when he says, "in Glasgow, the water fittings were very numerous, and as the great bulk of the house property had been put up by speculative builders, they were, as a rule, neither sufficiently strong nor properly finished." How absolutely true this statement is, if applied to this city, every plumber and dealer in plumbers' supplies knows.

The rules governing the class of fittings allowed, and the methods of doing the plumbing work, were printed at length in THE SANITARY ENGINEER of May 25, 1882, page 538; the leading features of which, not in force in this city are the following:

A stop-cock on the supply from street main to house.

Definite rules to govern the construction of cisterns with reference to the manner of attaching the ball cock.

The location of cisterns, the location of the overflow-pipe in a cistern with reference to the water line when ball-cock is closed, also the terminus of the overflow-pipe.

No fitting or appliance is allowed to be used that does not bear the maker's name and conform to a standard set by the chief engineer, and is not able to stand the tests to which it is subjected by the testing officers.

Ground key bibbs, or taps, are not allowed on pipes direct from the main.

No water closet can be supplied direct from the main, nor from a tap of any kind. Every water closet must be supplied from a special cistern so constructed as not to be capable of discharging more than a given amount of water at each flush, and so that it cannot be made to flow continuously, either by intention or neglect.

These latter rules, with regard to flushing of water closets, if strictly enforced in this city, would, in our judgment, save at least ten millions gallons daily. This estimate is justified by the results obtained by the water authorities of Boston in some tests made by them and reported on page 500, issue of May 11, 1882, of this journal. It is true that about a year since the Department of Public Works made a move to attack this abuse by revising the water rates, and with a view to discourage the use of these objectionable fixtures they increased the tax on them. We are informed, however, that thus far it is not enforced, and what bid fair to produce some good results and make a beginning must apparently rest in abeyance until Commissioner Thompson can find the time to realize that, aside from the necessity of building a new aqueduct, his duty is not performed until he resolutely, and without fear or favor, attacks this question of the suppression of waste.

The clause of the Act under which the Glasgow rules are enforced is as follows:

"*Sec.* 17. All the apparatus used or to be used for conveying water to the houses of the inhabitants and manufactories, or other premises supplied or to be supplied with water under the provisions of the recited Act, shall be subject to the approval of the Engineer to the Commissioners: and in case of dispute between the parties providing such apparatus and such Engineer, such dispute shall be determined by the Water Committee of the Commissioners, whose decision shall be final.

[TO BE CONTINUED.]

We print elsewhere a notice that the New York State Board of Health propose to hold a special meeting in this city, February 24, to enable manufacturers of food products to confer with the Board on the question of establishing standards and declaring exemptions under the food adulteration act. The holding of this special meeting in New York is evidence that the Board are anxious to do all they can to draw out the views of those interested in this question, and to so exercise the discretion that is vested in them as to cause no needless interference with honest trade. If manufacturers fail to make known to the Board the commercial issues involved, they must not complain that rulings made in the absence of such knowledge result in embarrassment and annoyance.

We trust the reputable dealers will be present and do what they can to assist the Board in intelligently enforcing this law.

We shall soon have to take hold vigorously and systematically of the matter of disinfecting and purifying sewage before turning it into streams. The complaints of pollution of water supplies in all parts of the country are increasing and will continue to increase. The public authorities ought to recognize the fact that a community has no more right to befoul their neighbor's water than an individual has to pollute his own or his neighbor's well. Among recent instances of this sort of procedure is the fact mentioned by a correspondent of the *Trenton State Gazette*, over his own signature, that the sewage of the New Jersey State Lunatic Asylum is discharged into the Delaware River, a short distance above the intake of the Trenton Water Works. This ought not to be, and there is no possible excuse for such a filthy performance on the part of a State. The water closets of the Capitol building might be made to discharge directly into the gutters of Trenton, with as much reason.

The Boston *Herald* of Jan. 29 comments upon our editorial notice of Jan. 25, upon the Massachusetts Conglomerate Board that our criticism was hardly fair. It says:

"There is no doubt but manufacturers have resisted and will resist any movement or legislation that would interfere with their business or entail additional expense upon them. But to say that they have banded together to kill off the the State Board of Health, because it inquired too closely into the nuisances they were creating, and that Mr. Talbot deliberately took position in the Board for the purpose of seeing that no such inquiry should be made in the future, are things that few persons in this State will believe. At the same time, it cannot but be admitted that it would be better that the State Board of Health should have an independent existence and individuality, as its mission—if it have ny—must necessarily be a singular and special one. THE SANITARY ENGINEER, no doubt, aims only at what it conceives to be the public good, and its utterances should therefore be entitled to consideration if not respect."

THE SANITARY ENGINEER does not wish to do injustice to anyone, and after further inquiry we are satisfied that while Mr. Talbot is opposed to legislation upon the subject of river pollution, yet it is not probable that he deliberately crippled the State Board of Health in order to prevent further investigation into this subject—an inference which might be drawn from our editorial.

But, while admitting that his action may have been due to a desire for economy and other proper motives, we think there can be no doubt that the results have been most unsatisfactory, and that his sneers at the medical men and sanitarians of the State indicate that he is exceedingly narrow in the view which he takes of the subject of public health.

What the source is from which the furnace draws its air supply will at this season largely determine the purity or impurity of the air in the house. The setting of the furnace is too often left to ignorant tinkers who know nothing about the proper methods, and we are informed by one of the principal furnace manufacturers that it is a common thing to find the air supply pipe entirely omitted, and the furnace drawing its air from the cellar. Of course, the consequence is, that as the air of the cellar is never of the best, and often polluted with decaying vegetables or fruits, its noxious qualities are distributed over the house. Two instances came to our notice last week when just such nuisances were caused in just such a way—by collections of vegetables near furnaces which had no outside air connection. It ought to be understood that a furnace is a powerful force pump, which will draw its air from the nearest source, and force it into the living rooms. If that source happens to be a cellar drain, as it was in a case we described last winter, then we have put a pump upon the sewer to draw its air indoors. It has been suggested that manufacturers of furnaces should send with them a sheet, giving plain directions for setting and connecting the furnace. If these did not enlighten the tinker, at least they would catch the owner's eye and direct his attention to what ought to be done.

From the report of a recent meeting of the Chicago Master Plumbers' Association printed in our last issue, it is evident that the majority of those present had a proper and enlightened view of the purposes and province of such organizations. It is with much pleasure that we note a disposition to taboo "unworthy members of the craft who willfully do a bad job, and generally are botches." It was also proposed "to submit to the press and public instructions regarding the best mode of taking care of a heated water-back so as to further instruct the people as to their use." This is indeed progress. Six years ago the latter proposition would have been assailed by many as "giving away the trade." We heartily congratulate the Chicago Association on this evidence of their public spirit and true appreciation of the position of the craft in its relations to the public. Public respect and influence will be secured by any association that is controlled by such liberal and enlightened ideas. Philadelphia has just organized a Plumbers' Society, and we commend to them the action of their Chicago brethren.

A house near Regents Park in London was recently burned down in the presence of the firemen, who were powerless to prevent it because the turn-cocks, who are relied on to turn on the water, could not be found. It seems that neither the police nor the fire brigade are permitted to have a key to turn on the water, and the turn-cocks, as stated by a writer in the *Times*, "have duties to attend to out of doors, and are not always to be found at home when wanted." Confessedly, this is a disgracefully stupid condition of affairs to be tolerated in the nineteenth century, and in the metropolis of Great Britain.

The city of Cleveland has an enviable prominence for the attention it has bestowed for some time past on the condition of its school houses. At the beginning of the last school year the Board of Education directed the Superintendent to report on this subject. Mr. Hinsdale has complied, and presents facts which show how unfavorable to health is the situation of a good part of the children during their school hours, for it is not to be supposed that the school houses of Cleveland are worse than the average, but the authorities have had the real facts got at as the first step in improvement. Seven thousand children are in school rooms which cannot be properly warmed in cold weather; thirteen hundred are in rented rooms, ranging from a church to a remodelled stable; five schools are in basements of school houses, and two of them have been pronounced by the health officers unfit for use in winter. The cause of these evils is overcrowding. The total capacity of the school rooms exceeds the number of school children, but the system of grading, the location and other causes, prevent the equal distribution of the children among the schools.

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PLUMBING IN "THE BERKSHIRE."

In the new apartment house called "The Berkshire," at the corner of Madison avenue and 52d street, of which Mr. Carl Pfeiffer is the architect and Mr. Harkness Boyd the plumber, there are some features of interest to plumbers, especially in the method of water supply, which is, of course, quite extensive in a building of this class, nine stories high, and covering a lot about 75 by 90 feet.

We will briefly outline the method of distribution by following (with the aid of the diagram on page 245) the course of the water from its admission to the house to its delivery at the fixtures. (The relative positions of the various objects represented have been considerably changed for convenience of illustration.)

The supply pipes throughout are of galvanized iron, except short lead connections to fixtures. The vertical lines are generally carried in accessible recessess in the walls. There are no considerable lengths of horizontal pipe above the cellar; here they are generally suspended from the floor beams. There are two 2-inch service pipes (*a*, *a*,) from the street, each of which has a meter, *b*, attached to it, the two pipes being connected with each other on the street side of the meter, so that either meter may register the flow through either one or both services. Thence the whole supply passes through the pipes *c*, *c* into a cistern *d*, of about 4,000 galions capacity, situated outside the foundation wall directly behind the meter and under the front stoop. A ball-cock on the end of the pipe regulates the supply, and a 3-inch overflow, *e*, discharges over a sink as shown. This cistern is used only as a reservoir from which the steam pump *g* draws its supply through the pipe *f*, to prevent injuring the meters, as there would be danger of doing by pumping directly from them. The suction pipe of the pump is, however, connected with the pipes leading from the meters to the cistern, so that the supply may be drawn directly from the meters, if necessary. The supply to all the fixtures is then forced through the 2-inch pipe *h* to the tanks on the roof (a height of about 125 feet), from which it is all returned to the cellar through the 2-inch pipe *j*, which is the main cold supply, and the 1½-inch pipe *l*, which supplies the hot water reservoir *m*.

The tanks are actually farther apart than shown—about 35 feet—and the man-hole cover seen on top is more nearly over the place where the pipes come up. They are closed tanks of iron, sheathed with wood and covered with tin. It is designed to have steam coils under them to prevent the water from freezing. The two are connected by the branch pipe *k* from the down supply, and have a combined capacity of about 4,500 gallons. The overflow is upon the tiled roof and the tell-tale, *p*, to a sink in the cellar. From the foot of the main down supply 2-inch horizontal lines are carried along the cellar ceiling to all the different lines of waste pipes, and from these points vertical risers taken to the highest fixtures. The largest of these are 1½ inches in diameter.

The hot water from the cylindrical iron reservoir *m* (of about 1,000 gallons capacity), is distributed in the same way through the pipe *o* and its branches, being heated by a 3-inch steam coil arranged horizontally in the reservoir at the height shown by the dotted lines. The several vertical lines of the hot water pipes are united above the highest fixtures which they serve, and extend up through the tank by a ¾-inch pipe having a return bend, *o'* at the top, as shown. There are no return circulation pipes.

A separate system of pipes for furnishing filtered drinking water to the kitchen is not shown in the sketch. The supply is taken from the tanks on the roof through galvanized iron pipes to two cylindrical charcoal filters (measuring three feet in diameter and six feet high) in the cellar, from which it is distributed to the different apartments.

The drainage system we shall not fully describe at present. In most respects it is not peculiar, but in simple accordance with the requirements and recommendations of the Board of Health. The method of disposing of the refrigerator waste and rain water from the roof, however, is noteworthy. The refrigerators used are a kind which has a slight trap attached to the waste. They are arranged one above another in vertical lines and accompanied by 2-inch waste pipes *r* (connected with no other class of fixtures), into which each refrigerator discharges through a 1-inch branch, on which is no other trap than that mentioned above. The main lines unite in the cellar, and after passing an S-trap discharge into a large underground roof-water cistern in the court, from which the hydraulic elevator is supplied. The overflow from this large cistern enters a smaller one under the cellar, which in turn discharges into the house drain, a double trap being formed in the latter by the inlet and outlet dipping below the water line.

AN IDEAL SANITARY DWELLING.

MR. JAMES C. BAYLES' LECTURE BEFORE THE MASTER PLUMBERS' ASSOCIATION.

Notwithstanding the rain and slippery streets, a large audience of plumbers with their families and friends was present in Steinway Hall on Tuesday evening of last week (Feb. 6), to hear Mr. James C. Bayles, editor of *Iron Age*, deliver the third lecture in the course of entertainments given by the Master Plumbers' Association of this city.

"No. 26 Daydream Avenue," which had been announced as the lecturer's subject, proved to be his idea of a model city dwelling, and his lecture consisted of a description of this ideal house which had been, in imagination, constructed for him in accordance with his ideas—particularly of the drainage, plumbing and heating.

The house was located in this city, and on a lot of ordinary size, but in the selection of a site great care was taken that it be on natural and not on filled ground, and especially not over a natural water course, or on ground impregnated with water. The neighborhood was good and there were no nuisances around.

To prepare plans and specifications a reputable architect was selected. The general plans, after some slight changes to suit the individual tastes of his family, were accepted, but not the specifications; the latter were of the usual ready-made, slip-shod style which mean nothing and fit anything with a little filling-in. The specifications for the plumber were very loose and allowed him the utmost liberty, provided he did things in a manner satisfactory to the *architect*; the *owner* might have nothing to say as to how it should be done. He, therefore, had "common sense" specifications made for each department, and detailed plans made. Specialists in each line of work were consulted, and it did not take long to learn that his architect knew little about healthy houses. Accordingly, instead of employing him further he sought and secured a competent superintendent for the work at a percentage very little greater than the architect would have charged. Bids were asked for from reputable builders; four were received, differing but little from each other in amount. Built in this way his house cost more than if he had retained the architect, and probably would bring no more if he wanted to sell it, but he had the satisfaction of feeling that everything had been well and thoroughly done in an approved manner. The ordinary contract system was a delusion and a snare, but it was useless to quarrel against it so long as people continue to demand the most show for the least money.

The speaker then invited his hearers to inspect with him the house as completed. He would first take them to the cellar. There they would find no water or mould. The nature of the site was such that drainage of the ground was unnecessary or inconvenient, but all moisture was kept out by a layer of asphalt between two layers of cement. There were no pipes underground. The soil pipe was of heavy cast-iron with lead joints, and continued along the cellar wall straight to the sewer, with all the grade allowed by the height of the cellar. It had no trap on it. The lecturer was well aware that this was in violation of the Board of Health regulations; but this was not an actual but his ideal house. If he were actually constructing a house in this city he would comply with the Board's rules, and would advise everybody to comply with them, though believing them wrong and working to have them changed. The speaker seemed very positive in his convictions that a trap on the house drain was a worse than useless obstruction. He thought every citizen should contribute to the ventilation of the public sewer, and if the pipe through his house was tight it could be done with absolute safety. The trap, he said, prevented a thorough flushing of the drain, and was the source of much of what was called "sewer-gas." He would rather go down in the man-hole of a public sewer, if he knew he should not become asphyxiated, than admit a little air from a filthy drain pipe into his bedroom. Ask anyone who had visited many new houses standing long unoccupied since their completion, whether they ever detected any odor of "sewer-gas" in them. Their replies would throw a flood of light on the subject of house drains.

The soil pipe was four inches in diameter. It was as heavy as he could get and ran straight up through the roof. The basins had a separate line of two-inch waste. A ventilating shaft from the bath rooms was carried up against his neighbor's chimney to create a draft in it; when this did not heat it sufficiently the draft was increased by a gas jet connected with it. The air pipe connecting with the traps of fixtures did not enter the soil pipe above the highest fixture, but ran independently through the roof. The overflows were into the safes, which had wastes discharging into a box in the cellar. No fixtures were boxed in, nothing was covered; no pipes were out of sight, except the connection between the basin line and the soil pipe and that was accessible without breaking the plaster. The service pipes were iron.

In concluding his description of the plumbing, the speaker renewed his argument against the house trap. In reply to those who claimed that the air within the soil pipe and house drain was kept in constant circulation and hence comparatively pure by means of a fresh air inlet, he said that the latter was in danger of becoming closed by accummulations at the point of its connection with the drain; and to those who cried danger of contagion through the public sewer, he had never seen any evidence of it, and would rather risk this possible danger than the known and demonstrable danger of the house trap.

For heating his ideal house he had considered the various methods and adopted the hot air furnace. It was cheaper than others, and the objections commonly urged against it were due to causes easily prevented. The most common defects of the furnace system of heating were improperly constructed furnaces—poor iron and joints, and defective flues—over heating, occasioned by having too small a furnace for the space to be heated; a foul source of air supply, and poor ventilation. He had two furnaces—a small one for moderately cold weather, and a larger one for very cold weather—of adequate size to furnish all the heat needed without burning the organic dust of the air. The supply was taken from twelve feet above the ground between the windows of the rear extension. The following was a good test for a furnace: throw into the fire-box old boots, arctic overshoes and marrow bones; then turn on the indirect damper; there should be no perceptible odor from the registers. By insisting on this test in bargaining for a furnace any man could get a good one, though he might have to go to a good many dealers before he found one to accept that condition.

For the ventilation of a small dwelling he did not advocate mechanical means. Fireplaces were found in the principal rooms at "No. 26," and that in the library was used to give cheer and brightness to the room as well as ventilate. In the smaller rooms fresh air was obtained through doors and windows.

The lecture concluded with a description of the interior finish and decorations. Hardwood floors were found in the better rooms and stained pine in the others. Rugs took the place of fixed carpets. There was no annual house-cleaning in "No. 26;" "we *keep* our house clean." Neither were there any poisonous wall papers. The lower portion of the walls were plainly decorated in water colors and the upper part and ceilings were elaborately and expensively frescoed in water colors and bronzes.

The next and concluding lecture of the course will be given in Steinway Hall on the evening of March 1, by the Rev. Howard Crosby; subject: "The Glory and Shame of New York."

Newport R. I. *News* says that an interesting little book is in the Redwood Library. It is entitled "Address of the Royal Jennerian Society for the Extermination of the Small-pox," with the Plan, Regulations and Instructions for Vaccine Inoculation. It was printed in London in 1803, and an autograph letter from Dr. Jenner, shows it was presented by him to a Mr. J. Monroe, of London.

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SANITARY INSPECTION OF HOUSES.*

The objects to be aimed at in constructing a system of house drainage are as follows:

First. All matter placed in any of the sanitary appliances in the house must be carried, with the greatest possible expedition, clear of the premises, leaving behind it as little deposit as possible.

Second. All sewer air must be prevented from entering the houses by the channels which serve to carry away the sewage.

Third. Since it is impossible to have house drains absolutely clean, that is, devoid of all decomposing matter, all air from house drains, and even from sink, bath, and other waste pipes must be kept out of the dwelling rooms.

To which might be added a fourth, that a constant current of fresh air must be established along every pipe in which it is possible that any decomposing matter may remain, so that such matter may be rapidly oxidised, or rendered innocuous.

The number of houses in which we find the drainage arrangements to be thoroughly good, and to be fulfilling these conditions, is surprisingly small. In fact, I may say, that in all the houses we are called upon to examine, except those which have been arranged, within the last dozen years or so, by some engineer, builder, or plumber who has made a special study of the matter, we find defects which interfere with the due fulfillment of one or other of these conditions.

I call your attention to defects quite commonly discovered in a London house. I have seen individual houses in which the drainage is more defective. In fact, I should describe the house illustrated now as somewhat below the average of the better class London house, as regards drainage arrangements.

The first point is the condition of the main drain. It is little other than an elongated cesspool. The size is unnecessarily large. As a consequence, even if it were perfect in all other respects, it would not be self-cleansing, inasmuch as there can never pass down the drain which serves for a single house enough water to scour out pipes of the size illustrated, namely 9-inch diameter.

The state of affairs, however, is far from correct, apart from the size of the pipes. In the first place, the joints are not tight; sewage will soak out into the ground through them. In the second place, although there is ample allowance between the two ends of the drain for a good fall, or incline, this fall has all been confined to a few feet of its length, the part underneath the house being laid almost level. This is done simply to avoid the trouble of excavating the ground to a sufficient depth. It is probable that, while the drain is new and the ground comparatively solid around it, sufficient water will remain in it to carry the greater part of the sewage to the sewer. But this state of affairs will not last; before long, some unusually heavy or obstinate matter will get into the drain; it will be carried only so far and then will stick. Any water now coming behind it will "back up," to a certain extent, and will very soon find its way into the soil, from one or more points behind the obstruction—not yet amounting to a stoppage. As a consequence, sewage now passing into the drain, loses its carrying power, and gets no farther than a certain distance. Before long a complete stoppage takes place, and all the sewage of the house soaks into the ground under the basement. After this, things go from bad to worse. The saturated ground no longer properly supports the pipes, which, as a consequence, will become more and more irregular, and all hope of the drain clearing itself is lost. It is only a question of time, with a drain such as I have shown, and the inmates of the house will be living over a cesspool.

As a matter of fact, total obstruction or stoppage has been discovered in six per cent. of the houses which we have inspected.

The soil pipe is of lead. This is an excellent material, if the pipe be properly arranged, but here it is not. The great fault is that there is no ventilation. As a consequence, the upper part of the pipe will always be filled with sewer gas, which tends to rise in a somewhat concentrated state. Now, sewer gas has a powerful action on lead, and, therefore, a soil pipe arranged without ventilation never stands many years before it becomes "holed;" that is to say, is worn through at its upper part. When this occurs, of course there is ventilation enough, but it is into the house. The ventilation in this case will, in fact, be most active, because every house, on account of the fires in it, acts, especially in winter, as a chimney, and draws in sewer or other gas from every possible crevice.

Now, although the constructor has not ventilated his soil pipe, he has been careful not to leave the system entirely without ventilation. On the contrary, by the simple device of leaving a rain-water pipe untrapped at the foot, he has ventilated the drains, and also the public sewer, into the back bedroom windows! This is a quite common arrangement. I have, within the last two months, seen two cases in which it has resulted in typhoid fever. In each case, the children slept in rooms, the windows of which were within a few feet of the upper ends of rain-water pipes, left untrapped, either through carelessness or through the idea that they would be useful as ventilators.

The only ventilation in this case is such as will permit the issuing sewer gas to find its way into the house. It is by no means unusual to find no provision at all for ventilation, or to find the ventilating-pipes so small that they are totally useless. In more cases than one I have found the soil-pipe carried up as a rain-water pipe into the attics, where it received rain water from two gutters, one from each side of the roof, and discharged all the sewer gas which escaped by it. Generally, the drinking water cisterns are situated in such attics.

Water, even in London, is almost always delivered in a sufficiently pure state to be drank, but it is a very common thing for it to be contaminated in the cisterns. Even if there be no actual disease germs carried into the water, there is liability of deterioration from the mere fact of a large quantity of water being stored for a long time before use. If the cisterns are of so great size as to hold as much water as is used in, say, three or four days, it follows that all water drawn has remained in these cisterns for an average time of several days. There are far more dangerous causes of contamination than this, however. The commonest of these is to be found in direct communication between the drains and cisterns through the overflow-pipes of the latter. A trap on the pipe by way of protection against the sewer gas is by no means an uncommon arrangement; but as will be readily understood, such a trap is absolutely of no good. An overflow pipe to a cistern is merely an appliance to be put in use in case of an emergency; that is, in case of derangement of the ball valve through which the water enters. As a matter of fact, an overflow may not occur from year's end to year's end—probably does not—and, as a consequence, the trap soon becomes dry, and the temporary security afforded by it is lost. In 37 per cent. of houses inspected we have found direct communication between the drain or soil-pipes and the drinking-water cisterns.

Another means by which the water of cisterns is contaminated is by their being placed in improper positions. Quite frequently, a cistern in which drinking-water is stored, is situated in, or even under, the floor of a water closet. I have known more than one case in which the drip-tray under a closet actually discharged into a cistern.

A paper on the subject of inspection of houses would be quite incomplete were it to contain only an account of the defects to be found, and to leave out altogether any description of the methods in use for discovering such defects. One thing that is absolutely necessary for such inspection, and without which it would be quite incomplete, is to open down to the drain. This should be done at the nearest point to that at which it leaves the premises. There is no absolute guide to tell where this point is, but after some experience it is generally possible to hit upon the spot with very little searching. The ground should be entirely removed from the drain for at least two lengths of pipe. It is also very desirable that a portion of the ground over the top portion of the drain should be removed.

We may next take the point of trapping of the main drain and ventilation of the system. It will be seen that the drain is shown to be in direct communication with the sewer. The consequence is that any leakage which may exist in the house drain permits gas not only from the drain itself, but from the sewer also, to find its way into the house.

The engineer will now be able to tell much of the state of affairs. He will see of what size the drain is; he will be able to tell of what material the joints are made, taking those exposed as samples; he will, in all probability, find the ground under the pipes soaked with sewage, and be able at once to say that the drain is in a leaky and bad condition; he will find whether it is properly supported on concrete, or has been "tumbled" into the soil; he will be able readily to discover what is the total fall in the drain from back to front. At this stage of the proceedings, the drain itself should not be opened; but, on the contrary, if the taking up of the ground should have exposed any joints which are evidently leaking, these should be made temporarily good with clay. The reason is, that it is desirable, before anything has been disturbed, to test the system for the purpose of discovering what amount of leakage there is into the house.

There are various ways of doing this, but the two commonest, which I intend to describe and illustrate to you are those known as the "peppermint test" and the "smoke test."

It will be quite evident that it is no use to pour peppermint into any of the appliances in the house, as, were such done, this smell would so rapidly permeate the whole of the premises, by way of the staircase, passages, etc., that time would not be allowed to detect the leakages. Some means must be discovered of getting the peppermint in from the outside. This is not always possible, but generally it is. In the case illustrated, there would be no difficulty. The rainwater pipe at the back admirably suits the purpose. One person gets out on the flat roof, near the top of the pipe, and provides himself with peppermint, and four or five gallons of water, as nearly boiling as possible. Meantime, all doors and windows are closely shut, and persons are stationed about the house to observe if the smell expected becomes evident, and to locate, as far as possible, the point from which it issues. The man on the roof pours about half an ounce of the oil down the pipe, and follows it with the hot water. As soon as possible he plugs up the top of the pipe with a towel, or some such thing, to prevent the occurrence of the vacuum which would otherwise be in the pipes, and which would tend to draw air from the house into the pipes instead of from the pipes into the house at any leakage. It would be probably not a minute before the people in the house would perceive the smell at various places. The manipulator of the peppermint must remain perched on the roof until those inside have had time to make their observations, otherwise he will infallibly bring the smell with him.

The test described is an excellent one. It is searching and is simple in application, but it has one drawback. It is impossible by means of it exactly to localize a leakage. This drawback does not apply to the smoke test. The smoke machine is nothing more nor less than a centrifugal pump attached to a vessel for generating smoke. The pump pumps smoke out by a pipe, which may be inserted in any pipe in direct communication with the drain or in an aperture made for the purpose. The test is, in all respects, similar to the peppermint one, except that the leakage is not smelt but seen, and as we all know seeing is believing.

After the test has been performed the drain may be opened by breaking into a pipe in front, by breaking off a collar, or by punching a round hole in the pipe. In any case it will be possible to judge much of the condition of the drain by the manner in which water runs through the pipes. If we have discovered that there is sufficient total fall we can now see whether or not it is uniform.

If the drain, after all tests so far applied, and from what can be seen of it, appear to be in good condition, it may be further tested by filling, or attempting to fill it with water. There is probably not an average of one drain in a thousand in London which would remain full of water for an hour. For the rest it is necessary to examine all appliances, to trace the pipes from them, and sometimes to test these pipes.

The engineer has now completed his inspection, and has but to consider how he will make the best of a bad job, and put things to rights. At the beginning of my paper I expressed my intention of confining myself to a description of defects, and said I should not describe what I considered a perfect system. I shall, however, point out to you one or two of the chief features of the arrangements in the house which I call well drained.

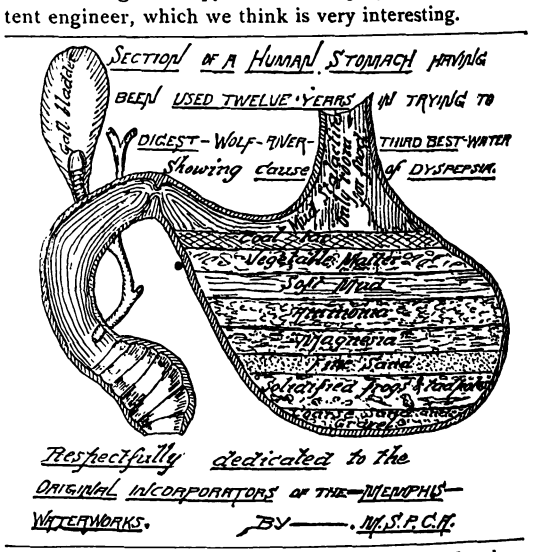
Most notable, probably, is the small size and sharp fall of the drain pipes. Further than this the drain is disconnected from the sewer by a trap which is accessible for inspection throughout, simply by lifting certain iron covers. A close examination would show that every foot of drain pipe and discharge pipe is so ventilated, that there will be a current of air through it; that no appliance discharges into the drain direct, but that there is an atmospheric disconnection in every case; that air from discharge pipes of sinks, etc., is all trapped from the house; that there is separate water supply for closets, and for other purposes; and that no cistern has any connection with the drains.

* From a paper read before the Society of Arts, London, by W. K. Burton.

MEMPHIS WATER SUPPLY.

We have several times had occasion to comment on the bad quality of the water supply of Memphis which is taken from Wolf River, a small tributary of the Mississippi, and have pointed out that this water supply is probably one of the special causes of the high mortality of the city for the last two or three years, and especially of dysenteric and other bowel affections.

We now give a copy of a section prepared by a competent engineer, which we think is very interesting.



It is a section of the stomach of a man who has been using the Wolf River water for 12 years, and while, like all geological sections, it is no doubt in part diagrammatic, we can say of it in the words of the old Italian proverb, "*Si non E vero, E ben trovat o.*" *i. e.*, if it is not true, it is well described.

Typhoid fever is still prevalent both in London and in Paris. In spite of the progress made in sanitary matters and the improved systems of drainage, I cannot help thinking, from my own personal experience of both cities, that much still remains to be done, and that the present state of affairs is accountable for much of the typhoid now prevalent. In London, if not in Paris, the main drainage system is now complete and mostly in good order, but the drainage of individual houses is often defective. I have been in many West-end houses in which the water-closets were placed in the center of the house and ventilated only on to the staircase. I noticed this arrangement in the town house of the late Earl of Beaconsfield in which he died.—*Correspondent of the Medical Record.*

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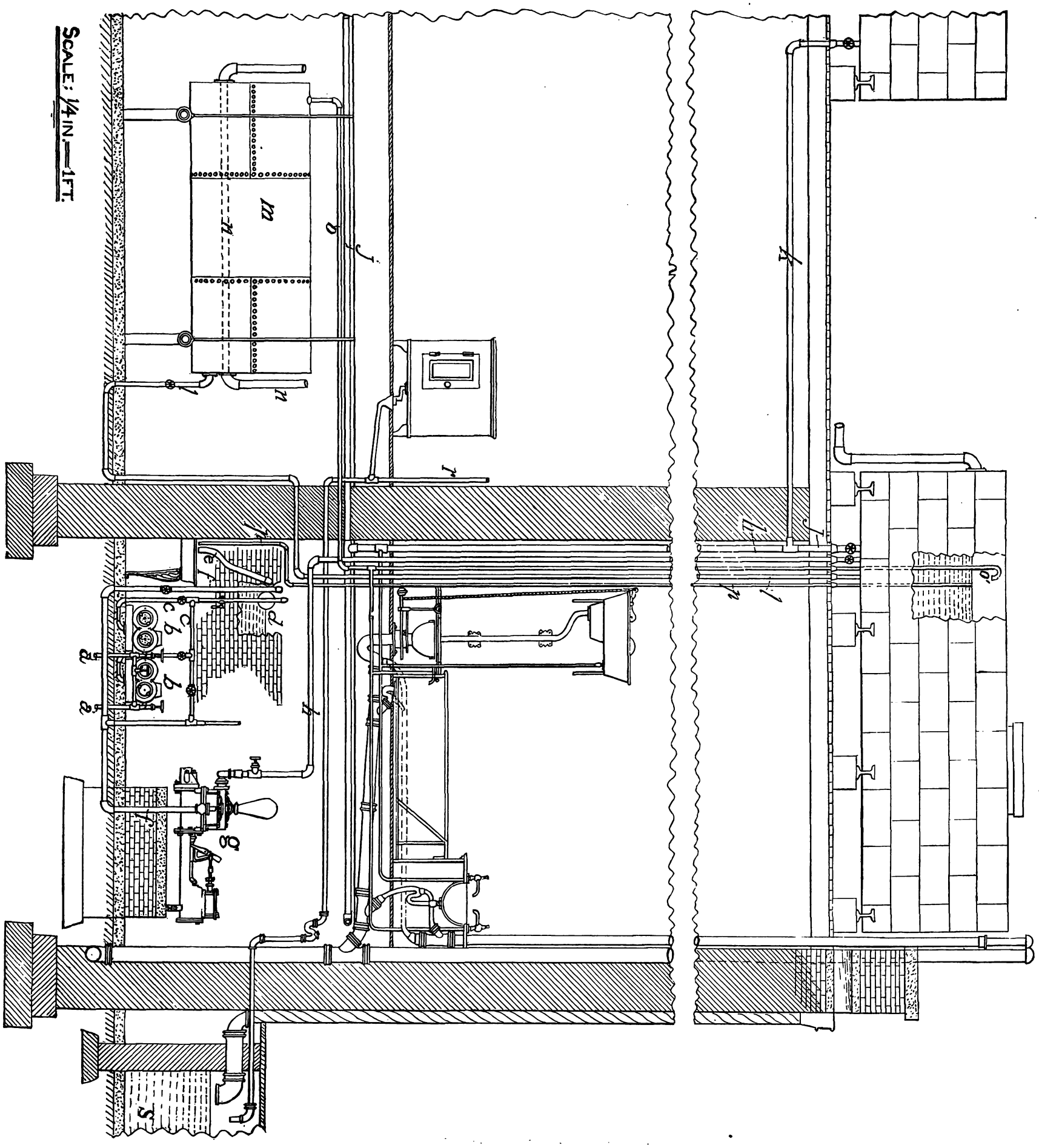

WATER DISTRIBUTION IN THE "BERKSHIRE" APARTMENT HOUSE. (See page 243.)

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PLUMBING IN FORT WAYNE, IND.

To the Editor of THE SANITARY ENGINEER:

I have been a constant reader of your valuable journal for several months, and have taken an interest in the valuable letters written, and suggestions and facts given, and have tried to put them to practical use. I am not sure whether you receive sketches or drawings from your readers or not, but I have sent to you a sketch of one of the first pieces of work that has been done in our city with a thorough ventilation of the waste pipes from the crowns of the traps. It has been customary for several years with our best plumbers to extend the soil pipes out at the top of the roof, but there has not been any ventilation of the traps.

The plumbers, Messrs. Hattersly & Son, are the contractors, and are doing the work under our supervision. All waste pipes are either cast iron or lead, all iron pipes coated on either side with mineral paint, all joints caulked with lead.

All lead connections to iron pipes are made through brass ferrules. Waste pipe from ice chest, sediment pipe from boiler, safe wastes discharge into the sink in the basement. Ventilation pipe *C* extends above the roof, no windows near it on third floor.

The soil pipe is 4", except that in the basement, as shown, it is 5", and connects with the sewer outside of the walls of the building. The upper end of the soil pipe runs to the attic, and thence into a hot air chamber at side of kitchen flue and from flue to the steam boiler. The bath room itself is also ventilated into a separate flue between these hot air flues.

Bower traps are used below the fixtures instead of traps as shown. The pipe *D C* is supply from the street with stop and waste inside of the stone wall; all of the pipe is graded to the stop, and waste connections are made with the boiler as shown, in case it should be needed. You will notice that there is direct connection with the closet. We advised the use of the cistern, but there was objection raised by the owner on account of expense. It has been the habit here to connect directly to the closet, as we have an abundant supply of water. Will you please state your objections to the direct connection? The pipe *F* is supply from the tank. The pipe *E* cold water supply, and pipe *F* supply hot and cold water to dressing room in front part of the house, and the basin wastes into the 2" cast iron waste below kitchen sink. The trap to basin is ventilated separately out at the top of the roof. We are not sure that all of these ideas and plans are exactly to your liking or your approval, but we have been the first ones to try and make a change in the customary way of doing work here; hoping there are a few things that will meet your approval we remain,

Yours respectfully, J. F. WING.

P. S. Stop cock on the supply from and to the tank, also expansion pipe from the boiler.

[It is gratifying to learn of the interest taken in plumbing work at Fort Wayne, and to see this evidence of progress; and it affords us pleasure to admit that we have no recollection of ever having received from a correspondent a better drawn view of the plumbing of a house than the one we here reproduce.

We notice an omission of the fresh air inlet, and from the description it is not clear whether the soil pipe extends beyond the roof, or terminates in a heated flue. We should prefer the former disposition of it.

The objections urged against direct (or valve) supply to water closets are the probability of contaminating the drinking water supply, the wastefulness of these valves, and the ineffectual flush as compared with a properly constructed cistern. This whole question was very fully discussed in THE SANITARY ENGINEER last year (see issues of March 30, and April 6, 1882.)

We are always glad to receive illustrated descriptions of work done outside of this city.]

EXPLOSION OF WATER-BACKS

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, *Feb.* 2, 1883.

To the Editor of THE SANITARY ENGINEER:

The excessively cold weather of this winter is giving the usual trouble in regard to the freezing of pipes from boilers to water-backs. Last week in Chicago the explosion of a water-back was attended with loss of life.

I have had to disconnect my boiler and stop its use altogether, owing to the impossibility of preventing the freezing of the connecting pipes.

On two occasions, recently, the pipes were found frozen, and only by the personal precaution of thawing out the pipes previous to lighting the fire, was an explosion avoided. I write this to ask you if it is not possible to devise some contrivance, such as a plug of fusible metal, or a cock to open at a high pressure, which, placed in the water-back, would obviate the danger of explosions when the connecting pipes are frozen? thus putting our cooking stoves and their hot water attachments within the intellectual range and ordinary care of our usual hired help.

Yours truly, R. J. FARQUHARSON.

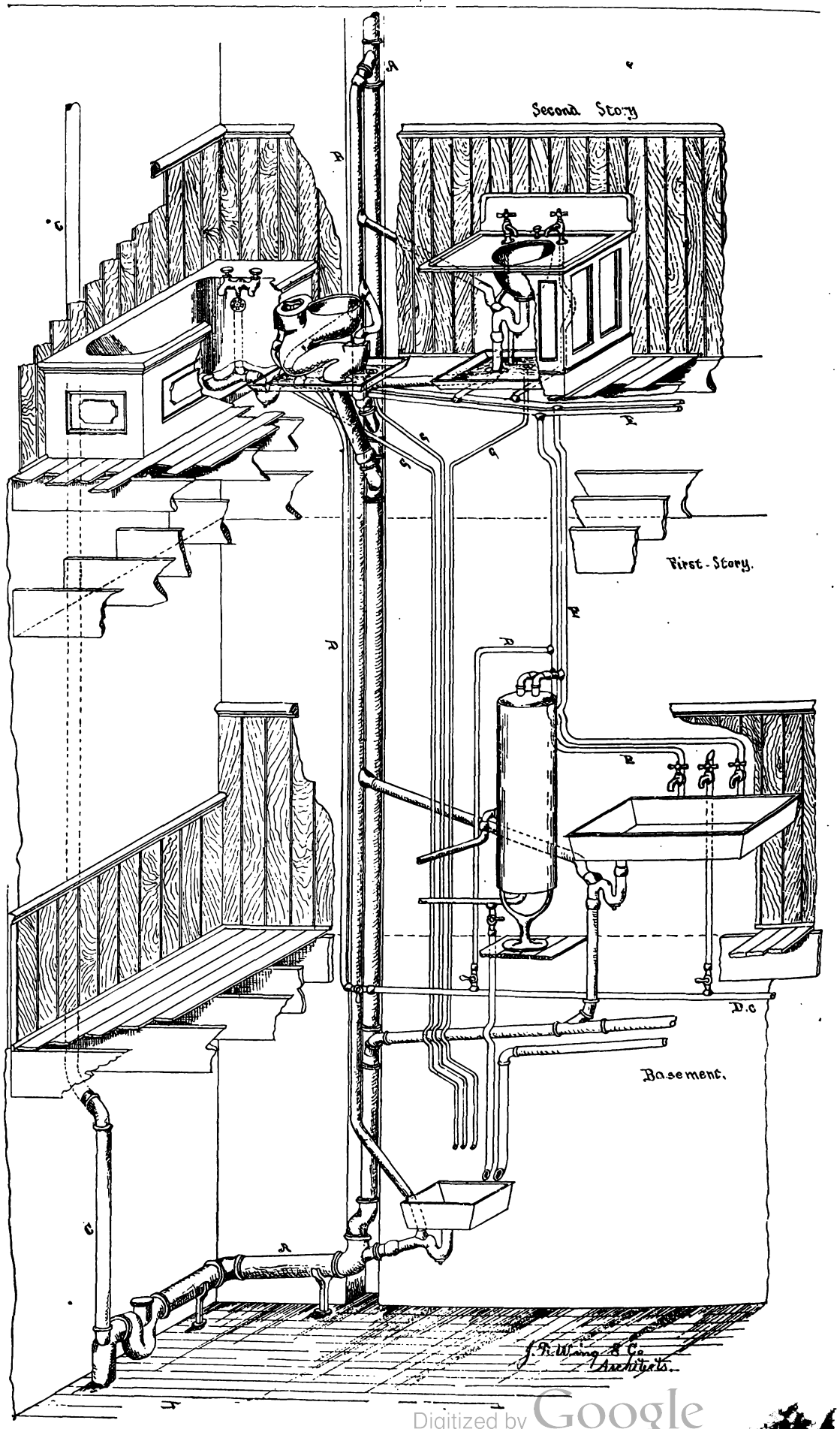
[We know of no contrivance that can be depended on in emergencies such as you suggest. The only plan is to keep up a good fire and not let the pipes freeze. If by accident the fire goes out, follow the directions contained in an article on page 286, issue of THE SANITARY ENGINEER of March 2, 1882.]

SIZE OF PIPES.

To the Editor of THE SANITARY ENGINEER:

Please inform me the size of lead pipes used for cold and for hot supply in ordinary house with water on three stories. Also, what should be the size of the circulation pipe as compared with the hot water pipe? B.

[The size is somewhat controlled by the ordinary street pressure. A 1-inch main supply from street tap to rear of house, with ¾-inch branch to boiler and as far as the baths, ⅝-inch beyond that, and ½-inch branches to basin cocks and water closet cisterns, will give a good flow at all times. If pressure is very strong and cost is an important consideration, these may be reduced one size. The return hot water circulation pipe should be at least ½-inch.]



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CATCH BASINS.

CINCINNATI, *Jan.* 29, 1883.

To the Editor of THE SANITARY ENGINEER:

Mr. Arthur Moore, Superintendent of the Cincinnati Water Works, says that catch basins in the city are a useless expense. The streets gutters should drain directly into the sewers through gratings. Especially in Cincinnati the sewer grades are steep enough and the flow of water sufficient to flush everything into the river. It costs the city from $25,000 to $30,000 per annum to clean out her catch basins. S.

[The question as to the advisability of having catch basins is one to be determined specially for each city, and even for its separate districts. Wherever sufficient facilities are had for a powerful and frequent flushing of the sewers, it would be folly to have catch basins. Wherever flushing is expensive, or the current is at best only sufficiently strong to carry away sewage deposit, but not street silt, it would, on the other hand, be an error to omit them. The expense of cleaning out the silt from the sewers would then be much greater than from the basins, not to speak of the dangerous results from the filling up of the sewers. There are only two cities in the world, namely, Paris and Hamburg, where the basins have been generally omitted with success. Some other towns have left them out in small districts, where sewers could be flushed from small watercourses. But in most cities, under ordinary conditions, the catch basins cannot well be done away with.]

THE POSITION OF EXPANSION TANKS.

KANSAS CITY, MO., *Jan.* 13, 1883.

TO THE EDITOR OF *The Sanitary Engineer:*

I wrote you in December regarding circulation in hot water heating apparatus; your answer does not seem to cover any of my questions. As I may have worded them so as to be understood wrongly, however, I will say that had I required any information I might have been misled by the answer, as you bring an old washing machine or dishwasher into use to illustrate circulation, comparing tubes inclosed with non-conducting surfaces and at most one foot long, with hot water work from 50 to 500 feet in length of 4-inch pipe with radiating surface. Also, in the machines you refer to, the tubes, if made to 4-inch diameter, would not spout a great deal of water, that is if they are used as I have seen them recommended in the directions—to only fill the boiler two-thirds full of water. My object in writing at first was to demonstrate a long contested argument that a more even temperature is gained by having return pipes twice as long as the flow; also to throw out tanks at ends and their large heating surface, which makes the house hottest by 10°, within six to eight feet of them. By having tank at boiler I can get a more even temperature and more rapid flow; that is, the water that leaves the boiler will get back quicker without the tank than with it. If you use illustrations, use something more appropriate to the question involved.

Yours, respectfully, THOS. H. WALKER.

[The preference in this part of the country as far as it is known to the writer, points to the use of the expansion tank at the highest point, at the end of the direct riser from the boiler. The return comes back downwards from the radiators to the boiler, to complete the circuit. This is thought to be most efficient—first, because of the stimulation of the circulation by the rise of vapor bubbles, as noted in our issue of Dec. 12, 1882, and secondly, because the expansion of the water, due to the additional heat, should take place in this direction. Otherwise, the expansion of the water would tend to arrest the circulation. To put the expansion tank on the riser, but close to the boiler, is simply to make the enclosed vapor act like the air cushion in the air chamber of a pump or a ram. It might as well be at the top, and would be under less pressure there. Accident to it would be less injurious to the building also. The air must be gotten rid of by relief valves at top or ends, and there are some advantages in having the vents on the tank. A skillful designer in New York has arranged his tank so that his system will change automatically from an open one for water to a closed circuit or steam system when a certain temperature of water is reached. This is done with the expansion at the top. There is no doubt that the tank at the top will be the hottest part of the job, as the correspondent very justly observes. He also says very truly that long return pipes promote a more rapid flow. This results from the fact that it is the descent of the cold water by gravity which causes the circulation. Hot water has no inherent buoyancy of its own (except in so far as the vapor bubbles are effective), but gravity acting to draw down the denser water, forces upwards the lighter hot water by displacement and sets up the circulation. Any modification of a device which will secure quicker descent of the cooler return water is therefore an obvious improvement. Where a tank acts to prevent quick return to the boiler, the correspondent very wisely suggests to leave it out from that place, and put it somewhere else. Therefore, opinion favors the location of the expansion tank on the upper end, because, looking at it in one way it is more efficient there, and because, from another point of view, it does less harm there and is likely to cause less annoyance by any derangement. But where a forced circulation is made a feature of the design as in most advanced practice, the expansion device may be put anywhere, or may be absorbed into the air-chamber of the pump. By forcing the circulation, not only is the heating surface more efficient in the boiler, but as also is the radiating surface in the rooms, and much less time is required to get the heat of the fire available in distant rooms. But the questions of the correspondent bear only upon gravitating systems, and in these it has been no doubt by his skillful management of detail in other parts that he has been able to secure such good results from arrangements which are not usually considered the most favorable.]

AUTOMATIC RANGE PUMPS.

BRATTLEBORO, VT., *Feb.* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

Being a constant reader and subscriber of your most valuable paper, THE SANITARY ENGINEER, I noticed in last week's issue, page 199, a communication from one B., inquiring about an automatic system of pumping water for domestic purposes. Enclosed please find some circulars of automatic pumps, of the kind you spoke of—some that were sent me some time since. Do not think they are now in the market, as we have heard nothing of them for some time. I send the circulars thinking they may be of some use to you. Respectfully, yours,

P. O. BOX, 158. WM. B. GOULD.

[Our correspondent sends us circulars several years old, of "Houghtons Automatic House Pump, or Water Elevator," and of "The Automatic House-tank Pump." of which J. C. & H. M. Wightman were the inventors. In both the force used is steam generated in the water back, or in a steam generator placed in the kitchen range. We learn that Houghton's pump is sold by William Mills & Co., 235 and 237 Washington street, Boston, but have not been able to learn anything about the present whereabouts of the Wightman Pump. The address given on the circular sent to us is, "The Automatic Pump Company, No. 7 Pearl street, Boston."]

SEWERAGE OF NORFOLK.

NORWICH, CONN., *Jan.* 22, 1883.

To the Editor of THE SANITARY ENGINEER:

In your last issue in an interesting article on the sewerage of Norfolk, Va., by J. H. Humphreys, it is stated that—"It is intended to provide for sewage and sub-soil water only." He then describes the provision for sewage but makes no further mention of the sub-soil water. Will he not explain in what manner he removes the latter?

C. E. CHANDLER.

[We referred the above letter to Major Humphreys, who sends the following reply.]

OFFICE OF THE BOARD OF STREET,
SEWER AND DRAIN COMMISSIONERS,
19 GRANBY ST., NORFOLK, VA., *Feb.* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

Referring to Mr. Chandler's question as to the provision for sub-soil water in the sewer system here, I explain that it is taken into tile drains laid within sewer trenches which discharge into sewer pipes of lower level, and through them into the pump-well. Yours,

J. H. HUMPHREYS.

SEWAGE PUMPING ENGINES.

CLEVELAND, OHIO, *Feb.* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

I want information on sewer engines and machinery; who makes them and where, and whether they have proved successful, etc. By answering you will much oblige,

Yours respectfully,

213 FRANKLIN STREET. E. B. D. LAMATER.

[This probably means engines for pumping sewage. Such an one built for Pullman, Ill., by Cope & Maxwell, is illustrated on page 35 of THE SANITARY ENGINEER, Dec. 14, 1882 E. D. Leavitt has built engines for pumping the Boston sewage, and George H. Corliss built an engine which he intended for the same purpose.]

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Feb. 10.....	24.63	18.55	22.14	27.95	29.10	19.74

E. G. LOVE, Ph.D., *Gas Examiner.*

INFLUENCE OF ATMOSPHERIC PRESSURE UPON THE FLASHING POINT.

In November last Professor Abel delivered an address before the Society of Chemical Industry, on "The Flashing Test for Petroleum." In the course of his remarks attention was called to the influence of pressure in determining the flashing point of oils.

Professor Abel is frank in saying that when his test was elaborated this point escaped notice. The matter has recently attracted some attention from certain experiments made in Germany, from which it was concluded that corrections for pressure were necessary.

The German observations, and some difficulties which have recently arisen in the application of the test in India, led Prof. Abel, in association with Mr. B. Redwood, to look into the matter, and they "found that there were certainly very tangible evidences of the influence of barometrical changes upon the flashing point of an oil, provided that the oil was for a sufficient period exposed to the influence of the change in the atmospheric pressure." In order to obtain evidence upon this point, Mr. Redwood proceeded to Switzerland, "taking with him five samples of petroleum of different flashing points, which were subdivided and carefully sealed up in a number of small cans, of such construction as to yield to decided variations in the the height of the barometer."

The following table shows the results of the different tests made.

No. of Sample.	Barometer.	London.	Paris.	Bouveret.	Visp.	Chamounix.	Zermatt.	Riffel.
	Inches.	30	30.15	28.75	27.5	26.42	24.3	21.5
1... ...	Fl'sh'g point	71°	71°	68°	66°	63°	60°	55°
2.....	"	73	73	70	68	64	62	56
3.....	"	76	76	73	71	68	65	63
4.	"	78	78	75	73	70	67	64
5... ...	"	85	85	83	80	78	75	70

Difference in barometer from London obser-tion.—Inches..... 1.25, 2.5, 3.57, 5.7, 8.5

Mean difference in flashing point per inch of barometer..... ...2.05°, 2.0°, 2.24°, 1.93°, 1.76°

The variation in the flashing points of the oils was therefore about 2° Fah. for every inch of barometer. The Germans found a difference of about 1.6°; but Professor Abel remarks that their tests "were made in a pressure apparatus, and probably sufficient time had not elapsed between the alteration of the pressure and the determination of the flashing point for the change in pressure to exert its full influence."

Professor Abel does not express any decision as to the necessity for making corrections, but says that the question "merits more attention and a more complete examination than it has yet received."

It seems clear that the flashing point is influenced to a certain extent by pressure, and where an instrument is used under greatly varying barometrical changes a correction may be desirable or necessary. It is equally clear however that until skilled observers can obtain results with but very slight differences, that is, within one degree, there is little use in making corrections for pressure.

ELECTRIC LIGHT NOTES.

There is talk of lighting Vineland, N. J., with the electric light.

A charter was issued Feb. 8 to the Pennsylvania Electric Light Company of Harrisburg, capital $50,000.

La Lumiere Electrique describes the lighting of the Alliser Theatre in Havana, in which Edison lamps are used. One hundred and ninety-three lamps are used, of which 182 are of one carcel and 11 of two carcel, replacing 342 gas burners. The difference of temperature within the theatre under the new and old conditions is 14° F.

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Engineering states the Campagnie Trans-Atlantique steamship Normandie will be lighted by electricity throughout, her equipment including side lights and head lights, engine and boiler room lights, steerage lights and hold lights. There are 400 Swan and 16 arc lamps. Sixty accumulators in addition to the Siemen's dynamos will be placed on board. Other vessels now lighted with electric lamps are the Arizona with 300 incandescent lamps; the Antonio Lopez, 70; the Orient, 160 incandescent and four arc lamps: the Austral, 170 incandescent and four arc lamps.

Meter-ites.

The Philadelphia *Inquirer* reports that a workman was suffocated while tapping a gas main in a Manayunk mill.

The Berlin Fire Department has introduced a new feature in their engines. The steam pumps are supplied with reservoirs of liquid carbonic acid. In case the engine reaches the fire before there is a sufficient pressure of steam, the carbonic acid is utilized to drive the pump.

A bill introduced into the California Senate limits the price of gas in cities of more than 100,000 population, limiting the price to private consumers to $1.50 per 1,000 cubic feet.

Food and Drugs.

SPECIAL MEETING OF THE STATE BOARD OF HEALTH.

We are requested to announce the following:

To Manufacturers and Dealers in Food Products:

The New York State Board of Health will hold a special meeting at the School of Mines, Columbia College, on 49th street, near 4th avenue, Saturday, February 24, at 10 o'clock A. M., to take action on exemptions and standards as contemplated by the law to prevent the adulteration of Food and Drugs.

The sections of the law on this subject are as follows:

"*Provided*, that the State Board of Health may, with approval of the Governor, from time to time declare certain articles or preparations to be exempt from the provisions of this act: And provided further, that the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food, provided that the same are not injurious to health, and that the articles are distinctly labelled as a mixture, stating the components of the mixture.

"It shall be the duty of the State Board of Health to prepare and publish from time to time lists of the articles, mixtures, or compounds declared to be exempt from the provisions of this act, in accordance with the preceding section. The State Board of Health shall also from time to time fix the limits of variability permissible in any article of food, or drug, or compound, the standard of which is not established by any national pharmacopœia."

This meeting is held in New York in order to enable manufacturers to appear before the Board and present their views.

The Board will be glad to receive communications, either in person or in writing, with regard to exemptions and standards that are desired.

THE RULINGS AS TO MIXTURES.

To the Editor of THE SANITARY ENGINEER:

In answer to your request for the views of manufacturers on the recently published rulings of the State Board of Health which requires the stating of the constituent proportions of permissible mixtures on the label, we would say that so far as we are concerned we care little about it, as our business is mostly in whole spices, and the spices we grind are almost entirely pure.

On the grounds of public policy, however, we are opposed to that ruling which would compel the merchant to state on the label what the mixture is and its exact proportions. We regard the English law as all that is necessary, and it is a great mistake to compel the grinder of coffees and spices to state the ingredients and the proportions of each.

If the question is raised that unless the names of the constituents are stated on the label, the public have no guarantee that injurious ingredients have not been used in the preparation of the mixture, we would say that as the State Board of Health prescribes what articles may be used as mixtures, and therefore only such articles can be used, that is sufficient guarantee to the public.

This ruling also bears on the question of trade-marks of special combinations, which have secured a reputation with the public, and we would say that in our opinion it publishes to the world the secrets of a man's business, and destroys all property interests in what he has spent his money to build up.

In fact your comments on this subject in your last issue we think expresses the views of honest and reputable manufacturers.

Yours, very respectfully,

123 Maiden Lane. PACKARD & JAMES.

To the Editor of THE SANITARY ENGINEER:

Referring to your recent comments on the State Board of Health rulings, I would say that I believe in publishing what the constituents are, but as to publishing the proportions that is another thing. I should object to a ruling which would compel me to publish just what the proportions of each grade of our mustards are. This is information which other manufacturers would give much to obtain, and customers who now come to us for special grades would then prepare them themselves. If the mixture is within the law it is not necessary to state what the exact proportions may be. It has been our practice to inform our customers of what they were buying by publishing on the package a notice to this effect: "This mustard is not pure, but the ingredients improve the quality and make it a proper consistency," and under the law we regard this as giving the public all the protection they can need.

We ourselves, would favor an absolutely pure mustard, but practically the public will not have it. They have been so long used to the mixed article that now if they buy the pure mustard it is so strong they regard it as adulterated. We find that a mixed mustard will sell three times to one which is pure, and we regard a mustard which has 50 per cent. of the pure article is better than one which has no foreign ingredients.

We consider that the action of the Board will principally effect the retail dealers, who will have on their hands an article which does not conform to their rulings. If the manufacturer would replace this with articles conforming to the law the retail dealer would be secured; but this will not be done, and it will be a serious matter with them.

Yours very truly,

257 Bowery. CHARLES L. STICKNEY,
Importer and Manufacturer of Mustards.

To the Editor of THE SANITARY ENGINEER:

In reading the recent decisions of the New York State Board of Health, concerning the adulteration of coffees and spices, our attention has been drawn to, what seems to us, the great injustice of some of their rules and requirements. For example, they declare as exempt, under the adulteration law, a coffee and chicory mixture, to which no other substance is added, but they prescribe that the proportion of pure coffee, in the mixture, shall not be *less than fifty* per cent. The requirement is also laid down that "the labels on such mixture shall be plainly and distinctly marked in letters of the same size as in the whole name of the mixture, so as to be read on one side of the parcel or package containing the mixture, in whatever quantity the same be sold, and the proportions of the two above designated parts (chicory and coffee) of the said mixtures shall in each case be distinctly marked and published on the said labels."

The question first in order might be, if, when articles for food or drink are exempted under the adulteration law, as wholesome and healthful, for the people to use at all, why should not the Board properly permit the mixture of those articles or substances, by the manufacturer, in such proportions as he may adopt? Not only this, but is it not an injustice to the manufacturer to deprive him of protection for his formula or trade-mark by compelling him by law to advertise them upon his labels, openly to the general public?

The compounding and blending of even coffee and chicory, so as to suit the popular taste, may be so much of an art, in its way, as to be worth money to the person possessing such a recipe. It is a secret of his business, and it has a value to him, inasmuch as it is a source of revenue to him. In that sense it is just as much a part of his property as any article or commodity he may own.

If the articles of chicory and coffee are healthful enough for general use *at all*, why are they not just as "healthful" in one proportion as another? Yet the "Board of Health" ordain that hereafter the legal limit of admixture of coffee and chicory is placed at fifty per cent. of each. This leads us also to refer to the decision of the Board of Health, limiting coffee mixtures to simply the component parts of coffee and chicory alone. There are other substances, of vegetable nature, entirely harmless in their effects, that have been heretofore largely used for mixing with coffee to reduce the cost. Roasted and ground peas, barley, wheat, rye, etc., besides being much cheaper, are much less injurious to many people, especially those of delicate nervous organization, than coffee when used alone as a beverage. Besides this, there is a large demand for *cheap* coffees that may not be produced at the required cost, without the admixture of some ingredients like those of cereal or vegetable nature. The result cannot be produced by the use of chicory alone. The mixture of fifty per cent. each, of pure coffee and chicory would be repulsive to ninety-nine out of every hundred consumers of coffee. Cheap coffees are demanded just as much as those of higher grade, but they cannot always be compounded according to the formala prescribed by the Board of Health.

WRIGHT, GILLIES & BRO.

237 WASHINGTON ST.

FALSIFICATION OF BRANDY.

A lamentable picture has been drawn in a recent report of the American Consul at Rochelle of the falsification of brandy, which, it appears, in the last three years has undergone a complete transformation, and is no longer brandy, the greater portion being prepared from alcohol of grain, potatoes, or beet. The most unsatisfactory circumstance is that even the merchants who desire to purchase a pure Cognac cannot be certain that they do so, for the proprietors of the vineyards, all of whom are distillers, have become so clever in the manipulation of the alcohols and the accompanying drugs that they deliberately make a brandy of any required year or quality. The mention of the years 1849 or 1876, for instance, in an invoice or on a label, means simply that article is presumed to have the taste or color of the brandies of those years. The increasing importation of German potato and beet alcohols into the Charente ports is an additional proof that the less brandy that is consumed the better for the health and intellect of the consumer. It is, moreover, becoming a custom to sell the brandy in 12-bottle cases, marked with one, two or three stars, according to the presumed quality, thus avoiding any compromising mention of year or place of production. Some of the manufacturers import the small raisins from the East, and make what they call brandy from the juice, there being at least one such establishment in operation at Cognac. Apart from the unsatisfactory purchase of a brandy which is not a brandy, drinkers should seriously consider what are the properties of the liquid which they are so complacently imbibing. It is simply an active poison, the imported alcohol, which is known to the trade as "*trois-six*," being of 90° strength, and sold at a little less than three francs a gallon. Its characteristic effect is to produce an intoxication in which the patient is especially inclined to rage and physical violence, while insanity, of an obstinate and almost hopeless form, is the inevitable consequence of a prolonged use of it. It is said that the great increase of violent and brutish crimes in France may be traced to the drinking of this brandy and absinthe. The slang term for a glass of Cognac is *un pétrole*, and for coffee with Cognac *un grand deuil*. Not only in France, but in other countries, and even in the United States, these liquors are producing a condition of national alcoholism of the worst kind, far beyond the ordinary drunkenness arising from unadulterated intoxicating drinks.—*London Times.*

MUSTARD CASES.

Three grocers, Simon Steiermann, 926 Second avenue, Philip Greifenstein, 833 Tenth avenue, and Charles Sinnigen, 1002 Second avenue, were arraigned before the Court of Special Sessions, on Feb. 9, on complaint of A. L. Colby, Inspector of the State Board of Health, for selling to him mustard which proved, on analysis, to be largely adulterated with common flour. All plead guilty, and were fined by the court $10 each.

The Reading *Times* advises the people of Philadelphia to let the Schuylkill alone and to take their water from the Perkiomen, an unpolluted stream. The advice is not so bad as far as the drinking water for Philadelphia is concerned, but it would not prevent the river water from being offensive as long as Reading is allowed to pour its filth into the Schuylkill.

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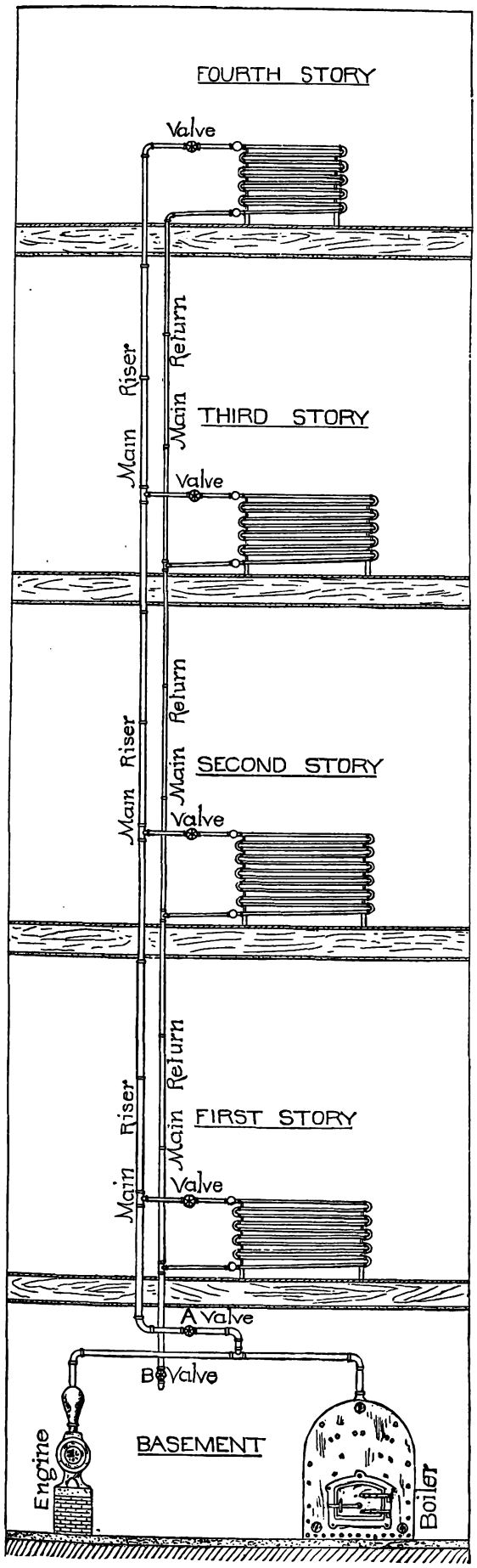
CONNECTING STEAM HEATING APPARATUS WITH STEAM ENGINE BOILER.

QUEBEC, CANADA, *Jan.* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Being a subscriber to your paper, I beg to inquire of you the reason why my heating apparatus does not work, hoping you will answer it. I use steam to heat a four story building; the boiler is in the cellar, and carries 45 pounds. It furnishes steam to run an engine and elevator.



In the first story there are 3 coils 4 ft. long, 10 pipes high, 4 pipes wide, and three coils 3 feet long, 10 pipes high, 4 pipes wide.

In the second story 3 coils 4 ft. long, 12 pipes high, 4 pipes wide.

In the third story 3 coils 4 ft. long, 10 pipes high, 4 pipes wide.

In the fourth story 2 coils 3 ft. long, 10 pipes high, 3 pipes wide.

The piping is done according to No. I. of Baldwin's book, *viz.*: Coils fed by main distributing pipes and main returns, as per diagram enclosed. Now what I wish to know is if I can work the apparatus successfully by carrying same pressure in coils as in the boiler, and return water to the boiler without any trap—I mean the Albany gravitating trap — or must I have a separate return, and bring condensation to the tank and feed it with a pump. As it is now, I bring it to the tank, but water gets so hot that the Hancock Inspirator refuses to work, and I have to discharge condensation in the sewer. In the morning the coils will start well on the first story, on the second slower, third more yet, and so on. When they are all hot, those on the first story will become cold in the lower range of pipe; they are one inch pipe coil made with return bend as shown in sketch, 4 feet long, 12 pipes high and 4 wide.

The main risers are of two-inch pipe on first story, one and one-half inches on second and third, and one and one-fourth on fourth, and main return one and one-half on first and second, one and one-quarter on third, and one on fourth story.

There are 14 coils, some are 3 feet long, 10 pipes high and 3 wide. I have a valve at top of coil, none at return; air cocks at top and bottom; air comes out very slowly. Main pipe is taken from one side of engine pipe with tee. Would it be possible when engine runs that it stop current of steam in coils? Fire is not kept during night. In the morning steam is raised, globe valve open and steam let in the coils. You would oblige me by giving your opinion of the trouble.

I have shown to some of my friends, plumbers, your commandments, and advise them to subscribe for your paper. I am trying the mayor and counsellers to pass a plumbing law here as they have elsewhere.

Yours truly, A. ROUSSEAU.

[You do not say how many "rising lines" you have to the 14 coils, but we assume you have not less than *three*.

If you take a separate 3-inch main pipe from the dome of the boiler, with its own separate valve, and run the pipe as described in Baldwin's book, "System No. 1," it will work without a trap or pump, and as a "gravity system," if the distance between the water line of the boiler and the lowest part of the main is, say not less than 24 inches; but the greater the difference of level the better.

Your horizontal main at any point should not be smaller than 2 inches. It will also be necessary for you to put return valves into the return water pipes at the lower ends of all the coils.

Your main return pipe need not be greater than 2 inches at its largest diameter, and it should have a stop valve close to the boiler, with a "swing" check valve close outside of the stop valve.

The kind of coils you use are a little troublesome with regard to drawing the air off, but we think they will give less trouble when changed to a gravity apparatus.

On page 205 of the book you quote above it, says, "Engine or pump pipes should not be taken from the steam heating pipe, as the draft they cause relieves the pressure in the heating apparatus, etc," and of course it is also meant not to take a steam heating pipe from an engine pipe.

If the cause of the lower ranges of pipes becoming cold cannot be traced to engineer nearly closing or "throttling" the valve *A*, for the purpose of keeping a greater pressure in the boiler or on the engine, then the cause is air which collects from some defect of construction.

If you do change to a gravity apparatus, it must be distinctly borne in mind that the main heating valve on the boiler, and in fact all valves in the heating pipes, must be wide open when the apparatus is in use.

You mention the value *B*, on the return, as opening into the chimney. We cannot understand why you do this, but on general principles we think it is wrong.]

NOTE.—In the illustration the engine is made to look like a pump. It is in reality a steam engine furnishing power.

PLUMBING LAW VIOLATIONS.

Only three reports of violations of the plumbing law were received by the Health Department of this city last week—one from Inspector Hooper and two from Inspector Elliot; both were of a trivial nature.

PHILADELPHIA PLUMBERS.

A meeting of plumbers was held on Feb. 5, in Mount Vernon Hall, 13th and Mount Vernon streets, to make arrangements for forming a protective association. Henry J. Burke presided, and in opening the meeting he stated the objects for which it had been called, one of which was to consider the charge that dealers were selling plumbers' materials to those outside the trade for less than they charged the plumbers.

There was present a committee of seven from the New York Plumbers' Association to assist in organizing the meeting.

A committee of twenty-one was appointed to draft a constitution and a set of by-laws, to be presented at the meeting on Monday evening next.

UNBALANCED BIDS.

A case illustrating the chance for fraud which exists in the ordinary method of letting work by contract to the lowest bidder, is now pending in the Supreme Court in this city.

A small sewer was to be built in the Twenty-third ward. An estimate was made by the assistant engineer in charge of that division, giving the probable quantities of the several items on which proposals were to be based, and by which the bids made were to be compared. This estimate was approved in due course by the Engineer in Chief of the Department of Parks, and the contract was advertised by the Department. Several bids were received. The one which footed up the least was made by the son of the assistant engineer, who made up the estimate of the quantities. This bid was an "unbalanced" or "gambling" bid evidently, for the prices bid for all the items were very low, except for "rock excavation," which was placed at $50 per cubic yard, while other bidders only bid from $5 to $7 per cubic yard for the same, but the quantity of rock excavation being estimated at only 10 cubic yards, the $50 bid was easily balanced by the low prices on the larger items. The law requires that every contract shall be let to the lowest bidder, and the Comptroller and the Park Commissioners could do nothing but award the work to this suspicious bid. But when the sewer was built it was found that there were 297 cubic yards of rock excavation instead of 10, and the contractors final estimate for that item only was $14,850 for work not worth more than $1,500 at the most. This made the work cost the city some $13,000 more than it would if the contract had been awarded to a higher bidder on the first estimate.

The presumption of fraud in this case was so strong, owing to the peculiar relations of the assistant engineer and the successful bidder, that the Chief Engineer very properly took measures in conjunction with the Comptroller to resist the payment of the final estimate due under the contract. The contractor applied to the Supreme Court for a mandamus to compel payment, and Justice Barrett has refused to grant it, which will oblige the contractor to have the whole matter ventilated if he attempts to push his claim.

Now there was nothing inherently wrong in the contractor making such a bid as this if he had reason to believe that the amount of rock as given in the preliminary estimate would be largely exceeded in the execution of the work, provided that he had not received the grounds for his belief from his own father who made the preliminary estimate. Many a reputable contractor has made such bids based on his own judgment of the unseen parts of a work as opposed to that of the engineer, and has made money at it. It is sharp practice, but it is a legitimate business transaction. It is not fair, however, to the city or corporation which has to pay for the work, and its allowance offers great opportunities for fraudulent collusion, as in this case and in the cases of the canal contracts which were ventilated by Governor Tilden a few years ago.

A remedy for the evil has been sought by engineers, but so far no efficient mode of guarding against it has been put into practice. A plan which seemed to promise efficient results was devised a few years ago by the engineer of one of the city departments, who had intended to try it in the next contracts he was to let, but it happened that his head fell into the waste basket while he was preparing the papers, and his successor was afraid to venture on any new experiments until he knew whether his own head was secure on his shoulders. The plan suggested was to enumerate the items and their quantities as usual, and to affix to each a fair price for that class of work, and foot up the total. Then require each bidder to make a proposition to do the work for a gross sum, with the proviso that he should receive as full compensation for each class of work a price bearing the same proportion to the engineer's figures that his gross bid bore to the engineer's total estimate. To illustrate: Suppose that the engineer's estimate of a piece of work was:

100,000 cu. yds. earth excavation	@	$0.15	$15,000
10,000 cu. yds. rock "	@	1.50	15,000
5,000 cu. yds. cut stone masonry	@	22.00	110,000
3,000 cu. yds. rubble masonry	@	6.00	18,000
2,200 cu. yds. concrete	@	5.00	11,000
Total			$169,000

Bidders would be required to name a gross sum. If, for instance, a contractor was satisfied that he could do the work for five per cent. less than the estimated cost, he would bid $160,550. In drawing the contract, the prices

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of all the items would be scaled down 5 per cent, and would be inserted in the contract thus:

For earth excavation	$0.14¼
For rock "	1.42½
For cut stone	20.90
For rubble	5.70
For concrete	4 75

Now if this work were let in the ordinary way, a contractor who had reason to believe that the rock excavation would turn out to be much greater than was estimated, and that the rubble masonry would be increased, and the cut stone masonry diminished, might bid as follows,

For earth excavation,	100,000 cu. yds.	@ $0.10....	$10,000
For rock,	10,000 cu. yds.	@ 9.00....	90,000
For cut stone,	5,000 cu. yds.	@ 5.00....	15,000
For rubble,	3.000 cu. yds.	@ 11.00....	33,000
For concrete,	2,200 cu. yds.	@ 4.50....	9,900
Total			$157,900

which would make his proposal $2,650 lower than the other man who bid fair prices.

If his surmise was correct, and the quantities were varied as he supposed, the two bids would stand as follows on the final estimate:

		By the fair bid.		*By the unbalanced bid.*	
Earth,	80,000 @	$0.14¼	$11,400	@ $0.10	$8,000
Rock,	30,000 @	1.42½	4,275	@ 9.00	270,000
Cut stone,	2,000 @	20.90	41,800	@ 3.00	6,000
Rubble,	6,000 @	5.70	34,200	@ 11.00	66,000
Concrete,	2,200 @	4.75	10,450	@ 4.50	9,900
Total			$102,125		$359,900

That is to say, the unbalanced bid, which was apparently the lowest, would result in costing the corporation more than three times as much as the fair bid, and would yield the contractor about 280 per cent. clear profits, instead of the fair profit of 25 per cent. This is a very fair specimen of what can be either lost by careless or tricky methods of letting contracts to the lowest bidder, or saved by judicious methods. A competent engineer is as well able to judge of the proportionate prices which should be paid for certain classes of work as a contractor is. In fact, most large contractors now employ engineers to make up their figures for them, and if the proposed plan were put into practice, no attempt at fraud of the kind produced by unbalanced prices attached to erroneous quantities could be made without being sure of immediate detection by the public and all the bidders.

CINCINNATI NOTES.

[From our Special Correspondent.]

Two momentous questions for Cincinnati have at last come up together for settlement, and it is not improbable that she is on the eve of expending millions to obtain a sufficient supply of pure water, and drain properly her large areas of unsewered territory. For this double purpose two bills have been introduced in the Legislature—one to levy a tax of one mill for sewerage purposes and the other to authorize the expenditure of over six millions of the earnings of the water works department to construct pumping works outside of the city limits. Although both these improvements have been regarded as necessities, until within a short time since, the way to accomplish them has not been apparent. The city engineer. Mr. Stanley, has said to the city: "Before you expend millions on a great trunk sewer to carry East Walnut hills' sewerage below the pumping works, consider the propriety of removing the pumping works up the river. Then the eastern hills can find many outlets by natural courses to discharge their sewage into the Ohio, and at half the cost." Then comes Mr. Moore, Superintendent of Water Works, and says officially to the city: "The water works department is in such a flourishing condition that it can take care of six millions of fifteen-forty bonds, which will be sufficient to construct nine miles of 60-inch pipe to Markley farm, together with necessary engines and reservoir." Hence the legislative action. *

[There is no doubt that the present location of the pumping engines at Cincinnati is bad. It was conceded to be so seventeen years ago, when Mr. Kirkwood made his report on the water supply, and recommended the removal of the works. The evil has been increasing ever since, as the city has grown, and the sewage and drainage from a larger area of populated territory has been discharged into the river above the intake of the water works. The theory that the expenditure of six millions of dollars is justifiable because consumers of water are taxed an amount sufficient to pay the interest on that sum, in addition to the cost of maintenance of the works, is not a sound one. There ought to be a certain proportion maintained between the sum contributed by consumers and that contributed by the public at large for the benefits accruing to property from the existence of a good water supply, which enhances values and reduces insurance. When the sum taken from consumers is so large that it suffices not only to pay all expenses, but to afford a revenue to the city and reduce the burden of taxes, it looks as if water rates were too high, and consumers paying more than their share of the public burden. It would be more equitable to so adjust the burdens as to make property pay interest on extensions of the works, and the consumers pay the cost of operation and maintenance.—ED. SAN. ENG.]

Construction Notes.

CINCINNATI.—The contract for the Custom House sewer has been awarded to Messrs. Peters & Scully, at $19,950.

COLUMBUS, O.—A bill is under consideration in the Ohio State Senate authorizing the city to issue $200,000 of bonds to complete the sewers now under construction.

PHILADELPHIA.—The Board of Surveyors have ordered a 28-inch sewer to be built from the one at Preston street and Myrtle, north on Calm st. to Westminster ave. to Holly st., and also that an oval brick sewer of 36 inches capacity be constructed on Twenty-seventh st. from Berks to Columbia ave., and a sewer to extend from Vine to Willow on Second, and one on Phillips from Morris to Berks street.

PRINCETON, N. J.—The Water Company will receive proposals until Feb. 27, for construction of a well, engine house, and boiler house chimney, for foundations of tower, laying water pipes, etc. Plans and specifications can be seen at the office of J. J. R. Croes, C.E., 63 Bleecker st., New York city.

MCKEESPORT, PA.—Proposals for iron truss or suspension bridge, over the Yougheogheny River, will be received by the McKeesport Bridge Company until March 1.

NEW YORK.—The Department of Public Works will receive bids until Feb. 21, for furnishing cast-iron water pipe branches and special castings, and laying mains in uptown streets and avenues. Also for regulating and grading certain designated streets, and laying flagging sidewalks, until same date.

LOWELL, MASS.—The contract for excavating about 225 lineal feet of rock tunnel to lay a sewer in, which is 9 feet 4 inches high by 9 feet wide, was awarded, Feb. 3, to Luther F. Kittredge, of Lowell, at $18.50 per lineal foot.

CHICAGO.—Proposals for street cleaning were opened by the Commissioner of Public Works Feb. 7 as below, and the first named, it is known, will secure the $90,000 contract: John Garrick, $33.49; C. Walsh & Son, $34.90; L. P. Wright & Son, $38.45; C. F. Hotchkiss, $39; Thomas Mackin, $44.

Work snails along on new city hall. Bids are being received by Architect Egan for the sanitary re-plumbing of the North Side County Buildings. Fire escapes are being put on the County Infirmary. The new morgue will be distant at least a mile, instead of only half a block, like the present, from County Hospital. Water works supplying poor house and insane asylum are likely to be built jointly by Cook County, Village of Jefferson and Town of Lake View.

SAVANNAH.—The message of the Mayor of Savannah, Georgia, states that the new five-million-gallon Worthington pumping engine has been running in a satisfactory manner since September 20. The ordinary expenses of the Water Department for the year 1882 were $13,752.65 and the receipts were $35,626.97.

NEW ORLEANS.—The New Orleans, La., *Picayune*, defends the repeal of the ordinance granting the right of sewering part of the city to the New Orleans Sewerage and Drainage Company, on the ground that it would cost the owners and occupants of the 30,000 houses in the district to be drained about $24 per year each, and that "the people cannot afford to indulge in so expensive an improvement in their present debt ridden condition."

PHILADELPHIA.—The architect of the public buildings has sent in to the Commissioners of the Building an estimate of the cost of the marble work yet to be done; he estimates it will require $593,696 to finish the marble work, distributed over the building as follows: the clock-tower $574,000, the court yard $1,820, the western front $1,350, the northern front $16,526. The contract for the entire marble work was awarded to Struthers & Sons, for $5,300,000, and there has been paid to them in all up to the present time, $4,365,275 11.

The streets of Philadelphia are in a fearfully filthy condition, and from present indications there is no hope for releif for some time, at least, of their being cleaned. The amounts of the lowest proposals, of the bids which were opened by the Highway Committee some time ago, was found to be in excess of the appropriation for the work, about $84,000, and in consequence no contracts were awarded for the doing of the work. The Commissioner of Highways, John D. Estabrook, has sent into the Committee on Highways a request that councils shall come to his aid by awarding the $84,000 extra required for the work. The committee, however, think that the specifications should be remodeled so as to reduce the required amount of work to be performed in the suburbs of the city and thus allow the contractors to be able to reduce the amount of their bids.

CINCINNATI.—The Committee on Water Works of the Board of Aldermen resolved the 9th inst. that the propriety of constructing water works at the Markley Farm costing $6,000,000, should be submitted to popular vote before any action was taken.

NEW YORK.—The following bids for furnishing 70 electric lights—including engines, dynamos, conductors, lamps and lamp posts—for the East River Bridge, were annouced by Engineer Martin at the meeting of the trustees on the 12th inst.:

Arnoux-Hochhausen Electric Co	$15,750
United States Illuminating Co	18,150
Schuyler Electric Light Co	20,000
Edison Electric Light Co	21,500
Brush-Swan Electric Light Co	23,273
Fuller Electric Co	25,455

Secretary Brown, presenting his annual report on the Toledo Water Works, says that the use of meters and indicators has greatly checked waste, the consumption in 1882 was 96,000,000 gallons less than in 1881.

The Chief Engineer of the Saratoga Fire Department reported to the Common Council that the water works afforded no protection in case of fire, and the Council requested the water commissioners to resign on account of inefficiency. The Troy *Times*, which is responsible for this statement, does not explain how the inefficiency of the pumping engines is supposed to communicate itself to the water commissioners, or how the resignation of the latter will improve the former.

Some manufacturers on the Blackstone River have applied to the Supreme Court of Massachusetts for an injunction restraining the city of Worcester from taking a portion of its water supply from the head waters of that stream, and thus injuring the water power.

The consumption of water by the people of Milwaukee the past week was 129,649,738 gallons, the largest amount ever consumed in one week by the city.—*Chicago Tribune, Feb.* 3.

The Joint-Sewerage Board of Kensington, on the Thames, England, has asked for an extension of the time allowed them in completing arangements for keeping all sewage out of the Thames. The schemes for irrigation have failed and the Board is now turning its attention to chemical filtration. Great dissatisfaction is felt throughout the district at the time and money expended in fruitless experiments, and some of the local boards are taking steps to deal with their own sewage independently.

SUNDRY AWARDS OF CONTRACTS FOR HARDWARE, ETC.

Custom House and Post Office at St. Louis, Mo. Bids for hardware received under advertisement of January 11, 1883. P. & J. Corbin, $4,641.65; Hopkins & Dickerson, $4,692.58. P. & J. Corbin's bid was accepted.

Custom House and Post Office at Cleveland. Ohio. Proposals for hardware opened at Treasury Department February 3, 1883. P. & J. Corbin $524 59; Hopkins & Dickenson, $538.14. P. & J. Corbin's bid was accepted.

Custom House and Post Office at Cincinnati, Ohio. Bids for fire-proof shutters, etc., under advertisement of November 20, 1882, and reported December 25, 1882, to THE SANITARY ENGINEER and published in No. 4. Vol. 7, dated December 28, 1882. The award has been made to the S. Fire-Proof Shutter Co., for $146,630.00.

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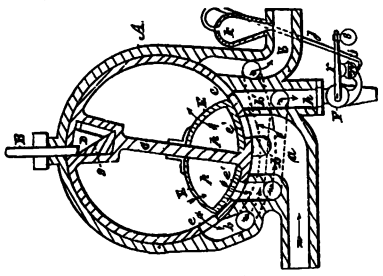
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

265,562. WATER METER AND FILTER. ROBERT C. BARRIE, Philadelphia, Pa., assignor of one-half to John H. W. Chestnut, same place. Filed Dec. 22, 1881. (No model.) Issued Oct. 10, 1882.



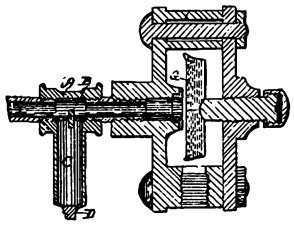
Claim.—1. In a water measuring and filtering device, the peculiar shaped inlaid piece of metal D, having inclined surfaces *f* and *g*, in combination with the other connecting and operating parts, as and for the purpose shown and described.

2. In a water meter, the cylinder A, piston C, and inlaid piece of metal D, having inclined surfaces *f* and *g*, in combination with the rod B and suitable connecting parts with the spring L, all arranged and operating together substantially as herein set forth and described.

3. In a water filtering device, the filtering chambers *p p* and sieves E, in combination with the cylinder A, piston C, inclined surfaces *f f g g*, rod B, and the connections with the spring L, all operating substantially in the manner and for the purpose shown and described.

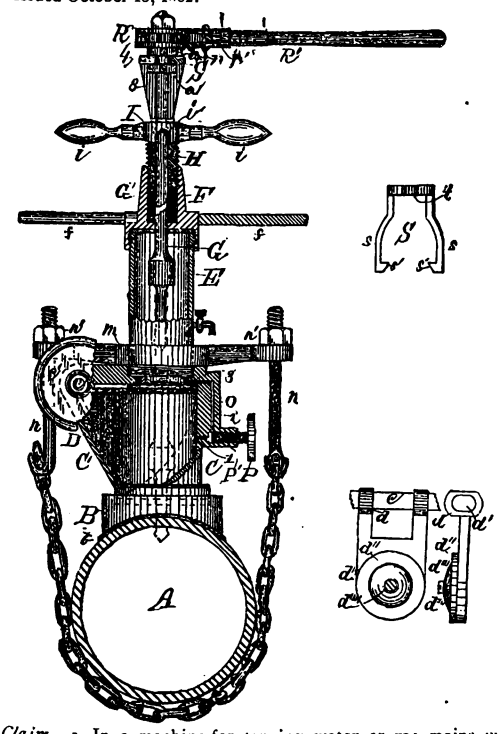
4. In a meter and filter, the combination of the valve F, the rod *r*, weight *s*, flexible ball *i*, tube or pipe *j*, and air chamber *k* with the waste pipe *h* and supply pipe *b*, as and for the purpose set forth.

265,600. SEDIMENT TRAP. LORING P. HAWES, New York, N. Y. Filed April 17, 1882. (No model.) Issued Oct. 10, 1882.



Claim.—In a sediment trap for pipes, the combination of a pipe coupling and a sediment chamber, provided with a discharging outlet, controlled by a valve or plug, with a transverse bar extending across the lower portion of the direct passage through the pipe coupling, and adapted for the passage of a diminished current under the bar and across the upper end of the sediment chamber, substantially as described.

265,624. MACHINE FOR TAPPING MAINS. HIERONYMUS MUELLER, Decatur, Ill. Filed Jan. 10, 1882. (No model.) Issued October 10, 1882.



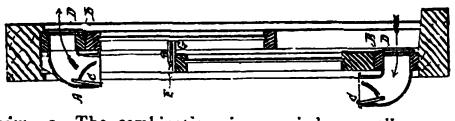
Claim.—1. In a machine for tapping water or gas mains while under pressure, an indirect communication between the upper and lower chambers independent of the valve D, said communication being controlled by a screw, P, as shown, for the purpose of equalizing the pressure in the upper and lower chambers when the valve D is closed, as specified.

2. In a machine for tapping water and gas mains while under pressure, the yoke S, having tangs, *s s*, provided with dogs, s^1 s^1, adapted to engage with the feeding-nut I by hooking into the oblong slots *i*, its upper part having slot *t*, which fits on the drilling-rod G between the collars *a a*, substantially as set forth.

3. In a machine for tapping water and gas mains, the combination of the swinging valve, the frame of which has the enlargements *d'* and oblong hole d^1, and the transverse shaft, from which the valve is suspended within the lower chamber, jointly with the soft-rubber disk d^2, secured to the upper surface of the valve by a metallic washer and screw, substantially as and for the purpose described.

4. In a machine for tapping water and gas mains while under pressure, the valve D, constructed as described, and suspended within the lower chamber, substantially as set forth, jointly with an indirect channel between the upper and lower chambers, through the projection or lug O, for the purpose of equalizing the pressure above and below the swinging valve, so as to facilitate its operation, said channel being controlled by a screw, P, substantially as and for the purpose set forth.

265,636. VENTILATOR. RUFUS S. READ, Philadelphia, Pa. Filed Mar. 20, 1882. (No model.) Issued October 10, 1882.

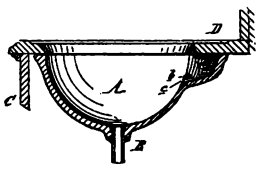


Claim.—1. The combination in a window-ventilator, of the oblong bar B, provided with oblique parellel ends *b* b^1, air-opening and wire-gauze D, curved through A, hinged cover C, and spring S, substantially as shown and described.

2. The combination of the adjustable plate G, slots *e* e^1, set-screws H H, air-openings and wire-gauze D^1 D^2, and cover E with the upper or meeting rail of the lower sash, substantially as shown and described.

265,653. STATIONARY WASH-BOWL. WILLIAM BLACKWOOD, Jr., Detroit, Mich. Filed Feb. 4, 1882. (No model.) Issued October 10, 1882.

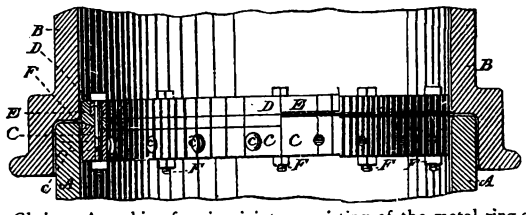
Brief.—In an offset of the bowl is a recess, *a*, for soap, which recess at top is covered by the top of the stationary wash-stand.



Claim.—1. A stationary wash-bowl provided with an offset having a recess, the front of which is protected by a ledge, and leading from which are one or more apertures, substantially as and for the purposes described.

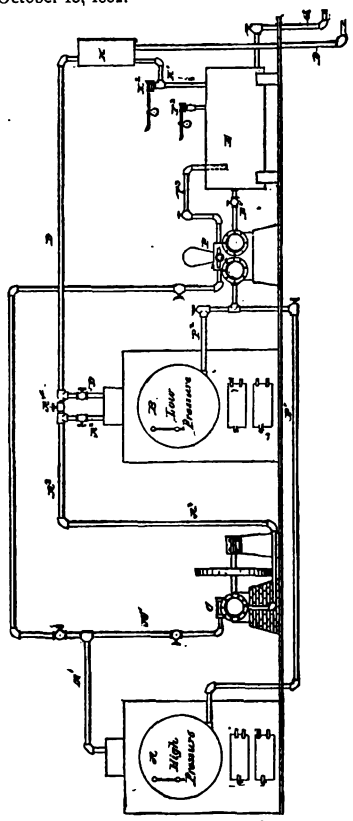
2. The combination of the stationary wash-bowl provided with a soap-receptacle, herein described, with a stationary wash-stand, the marble top of which forms the top of the recess in the bowl, substantially as specified.

265,681. PACKING FOR PIPE-JOINTS. ORANGE M. LOVERIDGE, Weaverville, Cal. Filed July 31, 1882. (No model.) Issued October 10, 1882.



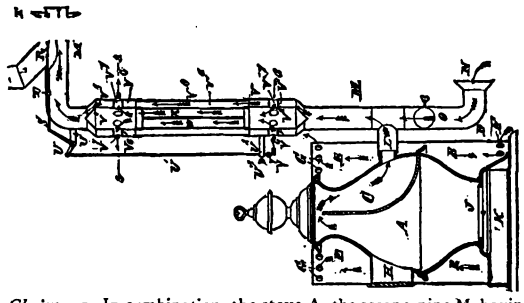
Claim.—A packing for pipe-joints, consisting of the metal ring or band C, secured within the end of a pipe, the metal ring or band D, and the intervening leather or flexible packing-ring, E, both of which are secured to ring C by bolts F, and extended beyond the end of the pipe, the flexible ring being turned down upon the outer surface of D, and the whole inserted within the enlarged end of another pipe, and operating substantially as herein described.

265,697. STEAM HEATING APPARATUS. EUGENE F. OSBORNE, St. Paul, Minn. Filed May 29, 1882. (No model.) Issued October 10, 1882.



Claim.—In combination with a steam heating apparatus comprising a pipe for the return of the water of condensation to the source of steam-supply, two steam-generators carrying different pressures and constituting such source of steam-supply, an engine connected between said generators so as to run by the difference in their pressures, and a pump and connections for returning the water of condensation to both generators, substantially as described.

265,802. COMBINED HEATER AND VENTILATOR. MATHIAS HECKEL, St. Louis, Mo. Filed Aug. 23, 1882. Issued Oct. 10, 1882. (No model.)



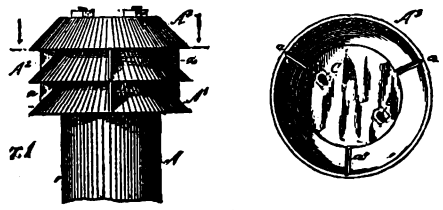
Claim.—1. In combination, the stove A, the escape-pipe M, having a lower extension provided with an open bell-mouth N, and damper O, and upper pipe. P, having open bell-mouth, Q, and damper, R, all substantially as shown and described, for the purpose set forth.

2. In combination with the stove A, the escape-pipe M, consisting of two portions connected by duplicate sections V V^1 and lengths of pipes V^2 V^6, the interior of the inner pipe communicating with the outer air by openings V^7 in the sections V V^1, substantially as shown and described, for the purpose set forth.

3. The combination of stove A, provided with diaphragm C, inclosing case D, provided with openings G at top and F at bottom, and escape-pipe M, made in two portions, connected by sections V V^1 and pipes V^2 V^5, and having a lower extension, with an open mouth N, and damper O, and an upper pipe P, with open mouth Q, and a damper R, secured to a rod S, and operated by a bell-crank lever U, all substantially as shown and described, for the purpose set forth.

265,810. ELECTRIC LAMP. DANIEL N. HURLBUT, Chicago, Ill. Filed Jan. 28, 1882. Issued Oct. 10, 1882. (No model.)

265,814. VENTILATOR OR CHIMNEY-CAP. JOHN H IRWIN, Morton, Pa. Filed April 24, 1882. Issued Oct. 10, 1882 (No model.)



Claim.—1. A ventilator or chimney-cap formed of cast-metal plates, as set forth, bearing wings or arms upon their upper surfaces, the upper edges whereof adapted and arranged to fit within grooves formed in the under side of the plate above, said plates being held in place and secured to a section of pipe or the chimney-top, substantially as shown and described.

2. In a ventilator or chimney-cap, pipe A, wherein are located eyes B, said pipe bearing annular plate A^1, having wings or arms *a*, plate A^2, having grooves therein or projecting studs thereon, as specified, and being provided with wings or arms *a*, plate A^3, and bolts or screws C, the whole combined and arranged substantially as shown and described.

3. In a ventilator or chimney-cap, pipe A, whereon is formed a rib, D, extending thereabove and from side to side, substantially as shown and described.

260,070. PUMP. SAMUEL S. ANDREWS, Knoxville, Iowa. Filed July 8, 1882. (No model.) Issued October 17, 1882.

265,607. PUMP. PIERRE E. JAY, New York, N. Y. Filed July 12, 1882. (No model.) Issued October 10, 1882.

265,621. WIRE-SUPPORT FOR UNDERGROUND CONDUITS. ALBERT H. MERSHON, Philadelphia, Pa., assignor to the Morse Underground Conduit Company of New Jersey. Filed Jan. 26, 1882. (No model.) Issued October 10, 1882.

265,630. APPARATUS FOR RAISING WATER THROUGH SYPHON-PIPES. JOHN PATTEN, San Francisco, Cal. Filed June 13, 1881. (No model.) Issued October 10, 1882.

265,657. STEAM PUMPING-ENGINE. GEORGE M. CONWAY, Wilwaukee, Wis. Filed December 27, 1881. (No model.) Issued October 10, 1882.

256,670. ELECTRIC-ARC LAMP. JOHN H. GUEST, Brooklyn N. Y. Filed June 22, 1882. (No model.) Issued October 10, 1882.

265,691. PUMP. LOUIS C. MILLER, St. Louis, Mo. Filed Jan. 28, 1882. (No model.) Issued October 10, 1882.

265,698. METER FOR STEAM HEATING APPARATUS. EUGENE F. OSBORNE, St. Paul, Minn. Filed June 27, 1881. (No model.) Issued October 10, 1882.

265,787. ELECTRIC LAMP. GEORGE W. BEARDSLEE, Brooklyn, N. Y., assignor to William F. Jobbins, East Orange, N. J. Filed June 15, 1881. Issued Oct. 10, 1882. (No model.)

265,775. ELECTRIC-ARC LIGHT. THOMAS A. EDSON, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York. N. Y. Filed Nov. 28, 1882. Renewed Aug. 14, 1882. Issued Oct. 10, 1882. (No model.)

265,776. ELECTRIC-LIGHTING SYSTEM. THOMAS A. EDSON, Menlo Park, N. J., assignor to the Edison Electric Company, New York, N. Y. Filed Nov. 11, 1882. Issued Oct. 10, 1882. (No model.)

265,781. REGULATORS FOR DYNAMO-ELECTRIC MACHINES. THOMAS A. EDSON, Menlo Park, N. J. Filed Aug. 7, 1882. Issued Oct. 10, 1882. (No model.)

265,784. REGULATOR FOR DYNAMO-ELECTRIC MACHINES. THOMAS A. EDSON, Menlo Park, N. J. Filed Aug. 14, 1882. Issued Oct. 10, 1882. (No model.)

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING FEBRUARY 3, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland ..... Maine	34,519	14	21 1	1	7.1			5	1	1	1	1	3	1						1			
Boston ..... Mass	407,581	158	19.8	54	34.1	1		26	2	6	9		1		3	18		5		3	2		2
Cambridge ..... Mass	57,432	24	21.7	8	33.3			4			2					4							
*Worcester ..... Mass																							
New Haven ..... Conn	66,979	34	26.4	12	35.2	3		4	1			1	1		1	3		3			1		3
Providence ..... R. I.	114,723	56	25.4	17	30.3			5	3	2	1		2		1	5			2		1	1	
Total	681,234	286	21 8	92	32.1	4		44	7	9	13	2	7	1	5	30		8	2	4	4	1	5
EASTERN CITIES.																							
Albany ..... New York	98,430	50	26.4	19	38.0			5	1		2		2		2	3		1	1				1
New York ..... New York	1,299,249	589	23.6	233	39.5	14	1	87	18	14	19	4	6	5	16	85		40		12	10		10
Brooklyn ..... New York	633,763	248	20.3	90	36.2	8		38	9	2	9	2			25	38	3	13	2	1	2		
Hudson Co. ..... New Jersey	228,025	70	18.0	31	33.2	5		14	2	1	7		1		6	10		2			5		
*Newark ..... New Jersey																							
*Camden ..... New Jersey																							
Philadelphia ..... Pa.	907,043	417	23.9	125	29.9	5		72	9		19	2	13	1	9	36	6	8	1	1		15	1
*Reading ..... Pa.																							
Wilmington ..... Delaware	46,889	17	18.8	5	29.4			3	1				1									1	
Total	3,213,399	1,400	22.6	503	35.9	32	1	219	40	17	56	8	23	6	58	172	9	64	4	14	17	16	12
LAKE CITIES.																							
Buffalo ..... New York	168,702	42	12.9	12	28.5	1		4			4	1			4						1		1
Rochester ..... New York	92,116	20	11.3	7	35.0		1	3	1		2		2			1				1			
Syracuse ..... New York	54,696	23	21.8	5	21.3			4		1			1			2					1		1
*Cleveland ..... Ohio																							
Detroit ..... Michigan	131,118	52	20.6	27	51.9			5		1	6	1	1		3	2	1	1					
*Chicago ..... Illinois																							
Milwaukee ..... Wisconsin	135,233	50	19.2	27	54.0	1		4	1		3	1			2	4			1				1
Total	581,865	187	16.7	78	41.7	2	1	20	2	2	15	3	4		9	9	1	1	1	1	2		3
RIVER CITIES.																							
Allegheny ..... Pa.	89,038	29	16.9	9	31.0		1	4		2	1		5			1							1
Pittsburgh ..... Pa.	191,523	78	21.2	30	38.4	3		12	1	2	6	1	4		1	6	1	1			2	2	4
Cincinnati ..... Ohio	267,767	114	22.1	35	30.7	5	1	18	2	2	4	1	3		6	10		5		2	3		3
Dayton ..... Ohio	41,648	16	20 0	5	31.2	1		2					1			3							
Louisville ..... Ky.	131,529	61	24.1	18	29.5	1		8						1		8		1			2	5	
Indianapolis ..... Indiana	86,529	23	13.8	8	34.7		1	6	1	2	1	1	4	1		2		1		1		1	
Terre Haute ..... Indiana	30,464	9	15.3	4	44.4	1		1						1			1						
Minneapolis ..... Minn	98,026	22	11.6	9	40.9	1	1		4		4				1	3		1		1		1	1
St. Paul ..... Minn	53,683	28	26.1				1	2	4	1	2	1				3		1		2		1	1
*St. Louis ..... Mo.																							
Total	990,207	380	19.9	118	31.1	12	5	53	12	9	18	4	17	3	8	36	2	10		6	7	10	10
PACIFIC CITIES.																							
San Francisco ..... Cal																							
Total																							
SOUTHERN CITIES.																							
District of Columbia .. Wh.	136,471	48	18.2	18	37.5	1		6	2		1				2	4						1	
" " Col.	71,103	35	25.6	13	37.1	2		7		1	1	1				4	1	1			1		
Richmond, Va. Wh.	38,526	12	16.1	3	25.0	1		1								5	1						
" " Col.	29,394	26	46.0	10	38.4	1		6					1			2	1						
Charleston ..... S. C. Wh.	22,699	7	16.0	2	28.5			1					1					1					
" " Col.	27,595	13	24.5	8	61.5																		
*Atlanta ..... Ga. Wh.																							
" " Col.																							
Savannah ..... Ga. Wh.	15,041	9	31.1					1			2										1		
" " Col.	16,506	13	41.0					2								2							
Nashville ..... Tenn. Wh.	31,993	12	19.5	3	25 0	1		3								3						1	
" " Col.	19,406	11	34.1	5	46.4											1						8	
Memphis ..... Tenn Wh.	18,677	12	33.4	3	25 0			4			1	1				1							
" " Col.	14,896	17	59.3	8	47.0		1	1					1			2					1		
*Mobile ..... Ala. Wh.																							
" " Col.																							
*New Orleans ..... La. Wh.																							
" " Col.																							
Total White	263,407	100	19.5	25	29.0	3		16	2		4	1	1		2	13	1	1			1	2	
Total Colored	178,900	115	33.4	44	38.2	3	1	16		1	1	1	2			11	2	1			2	3	
Total in 31 U. S. Cities	5,909,012	2,468	21.7	864	35.0	56	8	368	63	38	107	19	54	10	82	271	15	85	7	25	33	32	30
Jan. 20,—Total in 28 English Cities	8,620,975	3,862	23.4			119				40	22		56		86					82		7	97
Jan. 20, " 8 Scotch Cities	1,233,088	635	26.8			9				14	18		10		9			159		9			51

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending Feb. 4, in 31 U. S. cities, having an aggregate population of 5,909,012, there died 2,468 persons, giving a mortality equivalent to an annual death rate of 21.7 per 1,000. In the North Atlantic cities the rate was 21.8; in the Eastern cities, 22.6; in the Lake cities, 16.7; in the River cities, 19.9; and in the Southern cities, for the whites, 19,5, and for the colored, 33.4 per 1,000.

Deaths from small-pox are reported in Providence, Philadelphia, Wilmington, Pittsburgh, Louisville, Indianapolis, Minneapolis, St. Paul, District of Columbia and Nashville. The mortality from acute lung diseases continues high.

SANDWICH, ILL.—Dr. Ballou reports the prevalence of scarlet fever of a mild form.

LOUISVILLE, KY.—The weekly report shows five deaths from small-pox. Health Officer Montgomery considers the disease as under control.

PITTSBURGH, PA.—Dr. Snively reports one new case of small-pox during the week.

PROVIDENCE, R. I.—The death from small-pox given in the table is that of the patient reported last week as having come by sea from Baltimore, Md.

BOSTON, MASS.—C. E. Davis, Jr., reports 33 cases of diphtheria, 28 of scarlet fever, and three of typhoid fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 17 new cases of scarlet fever and six of diphtheria.

DETROIT, MICH.—Dr. O. W. Wight reports 25 cases of diphtheria, and 21 of scarlet fever.

NEW YORK CITY LUNATIC ASYLUM.—Dr. Franklin reports 13 admissions, one discharge, two deaths, and 1,325 insane patients remaining under treatment.

MOLINE, ILL.—Dr. Dunn reports the cases of small-pox under treatment in the hospital as doing well, and considers the disease as suppressed.

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ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths during the week. Consumption, pneumonia, congestion of lungs, and acute bronchitis one each.

BALTIMORE, MD.—During the week ending Feb. 3, there were 230 deaths: males 108, females 122; under five years 94, over 60 years, 31. The annual death rate is given as 29.24 for the whole population—25.18 for the whites, and 52.86 for the colored. Small-pox caused 69 deaths, accidents four, croup three, consumption 25, diphtheria 16, erysipelas three, typhoid fever three, malarial fever one, scarlet fever seven, bronchitis six, pleurisy one, pneumonia ten, and measles one. The births reported numbered 214.

HARRISBURG, PA.—During the month of January there were 32 interments. Diphtheria caused three of the deaths, consumption three, and pneumonia two. Four of the interments were of still-born children.

MICHIGAN.—During the week ending Jan. 27, the prevailing diseases as reported by Dr. H. B. Baker were in order of prevalence as follows:—neuralgia, bronchitis, tonsillitis, rheumatism, consumption, influenza, pneumonia, and erysipelas. "The reports show that, with the extreme low temperature and the considerable increase in ozone, there was a marked increase in the area of prevalence of erysipelas, influenza and pneumonia. Neuralgia, tonsillitis, diphtheria and bronchitis also increased in area of prevalence. There was no marked decrease in any disease reported. The correspondent at East Tawas reports the prevalence of a disease in his locality that first attacks the tonsils, then the pharynx, larynx and trachea, and sometimes the œsophagus, with enlargement of the glands of the neck, and suppuration in the ears. The health officer of the township of Crockery, Ottawa Co., reports the prevalence of sickness beginning with chills followed by fever, lasting from one to four days, with inflammation of the tonsils and throat. He also reports many cases of *winter cholera*, which comes on very suddenly and is severe."

Scarlet fever was reported at 19 places, diphtheria at 25 places, measles at nine places, and small-pox at one place, St. Joseph, Berrien Co.

DAYTON, OHIO.—The report for the week ending Jan. 27, shows a total mortality of nine, of which three are recorded as under five years. One death from each of the following causes is reported: consumption, diphtheria, pneumonia and small-pox.

HUDSON CO., N. J.—The report for the week ending Jan. 27 came too late to appear in our last week's issue. Total deaths 103; under five years 50; accidents three, cerebro-spinal meningitis one, consumption 15, croup four, diarrhœal diseases one, diphtheria six, malarial fever one, scarlet fever four, pneumonia 13, congestion of lungs one, bronchitis nine, and puerperal diseases three.

PITTSBURGH, PA.—Annual report for the year 1882. Dr. Snively, the Registrar of the city, transmits a copy of this report. The total number of deaths was 4,090 equal to a death rate of 24.0 per 1,000 (estimated population 170,000). There were 1,020 deaths of infants under one year, and 866 of children between one and five, making 46 per cent. of the total mortality. The deaths of persons over 60 years numbered 478. A report is given of the cases and fatality of infectious diseases, but, except with respect to small-pox, the cases reported do not embrace all that really occurred. There only seven cases of whooping cough were reported, while 96 deaths were recorded from this disease. Measles, 854 cases and 91 deaths; diphtheria 554 cases and 185 deaths; small-pox 1,136 cases and 300 deaths; scarlet fever, 234 cases and 63 deaths; typhoid fever, 1,782 cases and 268 deaths; cerebro-spinal fever, 56 cases and 34 deaths; other diseases of this class, three cases and 35 deaths. Total, 4,626 cases and 1,072 deaths. Measles prevailed most extensively in the spring, whooping cough in the summer, diphtheria and typhoid fever in the autumn and small-pox and scarlet fever in the winter months.

Consumption caused 316 deaths, pneumonia 306, bronchitis 106, diarrhœal diseases 375 and violence 333.

ONTARIO, CANADA.—The Provincial Bulletin for the week ending Jan. 27 says that, "In spite of the excessively cold and unusually severe weather of last week the report does not show any very extreme change in respect to any particular disease. This is due largely to the fact that diseases of the respiratory organs had in previous reports

(Continued on page 254.)

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already occupied a very high position. Thus bronchitis, influenza, tonsilitis, along with neuralgia and rheumatism, are still the prominent diseases. Among the peculiar features of this extremely cold week is the fact that in district IV, whence are reported over 700 cases of disease, diarrhœa not only becomes one of the six most prevalent diseases, but it amounts to five per cent. of all the diseases reported. Extreme cold as well as extreme heat would seem to have the same tendency; but while we must suppose that the former acts while producing internal congestions, the latter induces the disorder by the irritative effects of fermentative changes.

ENGLAND.—The annual mortality rate for the week ending Jan. 20, in the 28 great towns of England and Wales, averaged 23,4, Cardiff having the lowest rate, 13.9, and Manchester the highest, 31.4. The 22 deaths from diphtheria in the 28 towns included 13 in London and three in Liverpool. Small-pox caused three deaths in London, two in New Castle-upon-Tyne, one in Nottingham, and one in Derby.

London.—Births, 2,804; deaths, 1,663. The births exceeded by 28, whereas the deaths were 185 below the average numbers in the corresponding weeks of the last ten years. The annual rate was 21.9. Small-pox caused three deaths, measles 56, scarlet fever 42, diphtheria 13, whooping cough 26, typhoid fever 18, diarrhœa and dysentery 18. The deaths from diseases of the respiratory organs, which had steadily declined in the five preceding weeks from 637 to 361, were 389 during this week, or 130 below the corrected weekly average.

SCOTLAND.—The Registrar-General's return for the week ending Jan. 20, shows a death rate of 26.8 in the eight principal towns, which is 4.7 above that of the corresponding week of last year. The lowest and highest rates were recorded in Perth and Paisley, 17.0 and 30.8, respectively. The births numbered 868; for summary of deaths, see table given above.

PARIS, FRANCE.—There were 1,351 births and 1,135 deaths in Paris during the week ending Jan. 18. Of the decedents 600 were males and 535 females; 282 under five years and 258 over 60 years. Typhoid fever caused 68 deaths, small-pox 15. measles 14, scarlet fever four, whooping cough six, croup and diphtheria 37, erysipelas five, puerperal diseases five, consumption 203, bronchitis 35, pneumonia 93, and violence 31. On Jan. 14 there remained under treatment in the hospitals 75 cases of small-pox, 631 cases of typhoid fever, and 29 cases of diphtheria.

During the month of November there were 8,962 cases of diseases treated by *l'Assistance publique*, of which 7,881 ended in recovery and 1,081 in death. The numbers given below refer to recoveries and deaths respectively: Typhoid fever, 1,672, 191; small-pox, 51, 18; measles, 16, five; scarlet fever, 10, none; whooping cough, two, one; diphtheria and croup, 34, 55; acute bronchitis, 209, 26; pleurisy, 86, 22; pneumonia, 94, 51; pulmonary congestion, seven, seven; erysipelas, 79, 10.

HAVRE, FRANCE.—The Bulletin for the week ending Jan. 13 shows 76 births and 68 deaths as having occurred. Of the decedents 34 were males and the same number females; under five years 25, over 60 years eight. Small-pox caused one death, typhoid fever three, croup and diphtheria ten, consumption 19, bronchitis and pneumonia two. No deaths were recorded from measles, scarlet fever, whooping cough or puerperal fever.

RHEIMS, FRANCE.—Consul John L. Frisbie transmits the report for the week ending Jan. 13. Total deaths 43, under five years 15, over 60 years 14. Rate 23.83. Croup caused two deaths, acute bronchitis two, bronchial catarrh three, pneumonia two, consumption three and violence three. No deaths are reported from small-pox, measles, whooping cough, erysipelas, typhoid, scarlet or puerperal fevers.

BRUSSELS, BELGIUM.—During the week ending Jan. 13 there were 280 births and 204 deaths in the city and its suburbs, giving respectively the annual rates of 35.7 and 26.5 per 1,000. Deaths of persons under five years 89. Small-pox, measles, whooping cough and typhoid fever caused four deaths each, scarlet fever and diphtheria none, croup one, diarrhæa and dysentery 20, bronchitis and pneumonia 33, and consumption 28.

The Bulletin for the fourth quarter of the year 1882 shows a total of 3,509 births, males 1,818, females 1,591, corresponding to an annual rate of 34.5. Still births 211, deaths 2,096, males 1,087, females 1,009; under five years 801, over 60 years 479. Annual rate 20.6. Small-pox caused 28 deaths, measles seven, scarlet fever six, typhoid fever 30, croup 30, diphtheria four, whooping cough ten, puerperal diseases 24, bronchitis and pneumonia 312, diarrhœa and dysentery 232, consumption 303 and violence 58.

COPENHAGEN, DENMARK.—There were 107 deaths during the week ending Jan. 9; under five years 50, over 60 years 20. No deaths were reported from small-pox, measles, or whooping cough. Scarlet fever caused one death, diptheria and croup four, diarrhœa six, puerperal fever two, and typhoid fever one, consumption nine, pneumonia nine, pleurisy one, and bronchitis eight.

The cases reported were as follow: Small-pox one, measles six, scarlet fever 35, diphtheria 16, croup seven, whooping cough 45, typhoid fever five, diarrhœa 98, erysipelas 25, bronchial catarrh 476, pneumonia 67, and tonsillitis 135.

MILAN, ITALY.—Consul Dunham J. Crain reports 783 deaths for the month of November, 41 of which were caused by typhoid fever and 18 by diphtheria. Of the latter disease 31 cases were reported as compared with 15 cases (eight of which were fatal) during the previous month. Mr. Crain remarks that the city is exceptionally free from winds and is, on that account, regarded as favorable for consumptives. The population is estimated at 320,292.

VIENNA, AUSTRIA.—Consul-General Weaver reports 397 deaths for the week ending Jan. 13, 106 of which were caused by consumption, 70 by acute lung disease, three by small-pox, two by scarlet fever, five by diphtheria, one by whooping cough, one by typhoid and four by typhus fever. Deaths under five years 139. Death rate 27.5.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits the report for the week ending Jan. 6. Total deaths 92; males 43, females 49; under five years 45, over 60 years 16. Measles caused five deaths, scarlet fever one, whooping cough three, diphtheria six, typhoid fever one, consumption 11, pneumonia 19, bronchitis nine, and violence one Looking at the number of cases reported bronchitis, measles and scarlet fever are the prevailing diseases.

SMYRNA, TURKEY.—Consul W. E. Stevens reports under date Jan. 15 that he has just received official information that the quarantine established against the province of Hedjaz, in which is situated the town of Mecca, has been raised, the cholera having subsided.

Mr. Stevens reports also that the small-pox has ceased to be epidemic in Smyrna, the disease having yielded to preventive measures and vaccination. A few cases continue under treatment in the hospitals.

CALCUTTA, BRITISH INDIA.—Consul-General Mattson transmits reports for the weeks ending December 16 and 23.

December 16. Total deaths 383, giving an annual rate per 1,000 of 46.1 as compared with 41.4 in the previous week. The cholera mortality is very high, 107 deaths having occurred from this cause. The northern sections and suburbs are mainly affected. Fever caused 95 deaths, diarrhœal diseases 48, tetanus 31 and consumption seven.

December 23. Total deaths 359. Annual rate 43.2. Cholera abating somewhat, but still high, the deaths numbering 97. Fever caused 91 deaths, diarrhœal diseases 50, tetanus 22 and consumption nine.

SHANGHAI, CHINA.—Vice-Consul-General F. D. Cheshire reports that during the weeks ending Dec. 26 and Jan. 2, a few cases of small-pox occurred among the foreign population.

BOMBAY, INDIA.—Consul B. F. Farnham transmits report for the week ending Jan. 2. Deaths 429, being 59 less than the mean of the corresponding period in the previous five years. Annual rate 27.37. Remittent fever caused 85 deaths, cholera one, acute diseases of the respiratory system 65, diarrhœa 23 and dysentery six. The births reported during the week numbered 326.

ST. PAUL DE LOANDA, AFRICA.—The small-pox epidemic is abating. During the month of November 21 cases were reported, of which nine were fatal.

QUARTERLY MEETING OF THE STATE BOARD OF HEALTH.

The State Board of Health of this State held their quarterly meeting in Albany, Feb. 6, Hon. Erastus Brooks presiding. Attorney-General Russell submitted facts pointing to the necessity of investigating the nuisances connected with the petroleum refineries on the New Jersey shore of the Kill Von Kull. The Board ordered the necessary inspection. The Standard Oil Company agrees to comply with the recommendations of the Board's Inspector.

The Board discussed the general drainage law of 1869, and the recommendations on the subject were referred to the Attorney General to be put in shape to be laid before the legislature.

PARASITES IN PORK IN MONTREAL.

Dr. Wm. Osler, assisted by A. W. Clement, has published, in the Canada *Medical and Surgical Journal* for January, 1883, the results of an examination made by them of the carcasses of one thousand hogs slaughtered in Montreal, chiefly at the Dominion Abattoir during the past eight months. No selection was made, the carcasses being taken indiscriminately, as found at the time of visit. All the animals examined were from Western Canada. In four of them the trichina spiralis was found. This proportion, viz.: 1 in 250, is low, as compared with that obtained by Mr. Billings, in Boston, viz.: from 1 in 17, to 1 in 44, or with that found in a series examined a few years ago in Chicago, viz.: 1 in 49.8.

Of 1,037 hogs examined, 76 were infested with the cysticercus or measle, the cause of tape-worm in man, giving a proportion of 1 in 13.6.

The following are the conclusions of the paper:

"1. The investigation shows that the hogs slaughtered for our markets, present parasites in numbers sufficient to necessitate a more thorough inspection than is at present carried out.

"2. As regards trichina spiralis, which was found in the proportion of 1 to 250, we are of opinion that, considering the extreme rarity of cases of trichinosis, and the difficulties attendant upon a systematic inspection, a compulsory microscopic examination of the flesh of every hog killed, is not at present called for.

"3. In the case of 'measles' the liver should be carefully examined, and if present in it, the flesh of the animal should receive the special attention of the inspector; if only in the liver, the entire carcass need not be confiscated.

"4. Echinococcus cysts in the liver, render that organ unfit for food, but in other parts, unless very numerous and disorganizing, they may be cut out, and the carcass remain marketable.

"5. The public should be made aware of the possible dangers of eating in any form, raw, or partially cooked meat. The best safeguard against parasitic affections, is not so much inspection of the flesh, unless, indeed, this is minutely carried out, as careful attention to culinary details.

"6. To reduce the number of infested hogs, great attention should be paid to their hygenic surroundings, particularly in the matter of feeding. The danger is not during the period when the animals are penned and fed on grain, etc., but when they are allowed to roam at large, and feed indiscriminately."

Martin's *Chemist's and Druggist's Bulletin* will be issued after issued as a semi-monthly journal, under the title of *Pharmaceutical Record*, with Mr. P. N. Bedford, who has been for some time editor of the *Bulletin*, manager and editor. The first number presents a neat appearance, has strong backing, and is devoted to the interests of pharmacists, which its editor is qualified by special training to well serve.

In Pennsylvania, on the 26th ult., a resolution was introduced in the House, to investigate the pollution of rivers of the State. Also to establish a State Board of Health for protection of life and to prevent spread of contagious and infectious diseases.

It is becoming quite common now in Cincinnati, in making house connections with sewers, to have water closet vaults or new receptacles beneath the pavements. They have a valve through which they may be flushed and discharged into the sewers. There are several patents in use.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

23d st., Nos. 156 and 158 E, near 3d av, br stable and dwell; cost, $10,000: o, Anton Markert; a, F. Jenth; b, Hy. Westphal....45th st, No. 240 E, b syn; c, $12,000; o, Communante Israelite Francaise, 3d av, n w cor 25th st; a, W. Graul.... 48th st, s s, 100 e 10th av, five brown st ten; c, each, $13,000; o, John Livingston.....3d av, Nos. 443 445 and 447 and No. 206 E 3:st st, br theatre; c, abt $50,000; o, Annie L. McCahill; a, A. Chamberlain....4:h av, n e, cor 58th st, br stable; c, $10,000; lessee, James A. Flack; a, A. B. Ogden....59th st, s s, 120 E. 6th av, two br and brown st ten; c, each, $300,000; o, George Munro a, J. Correja; b, R. L. Darragh, and McGuire & Sloane....80th st, s s, 250 w 3d av, brown st ten; c, $78,500; o, August Schwarzler; a, J. Brandt....5d av, w s, 139.2 n 114th st, br and brown st store and ten; c, $15,000; o, Darius G. Crosby; a, D. & J. Jardine; b, E. Kilpatrick. 2d av. n e cor 63d st, brown st store and ten; c, $16,600; o and b, Graham & Connors; a, J. C. Burne.. 2d av, e s, 20.5 n 63d st, three brown st ten; c, each; $18.000; o, a, and b, same as last....63d st, n s, 80 e 2d av, five br ten; c, each, $20,000; o, a and b, same as last.... 78th st, n s, 50 e 3d av, nine br and gl stores; c, each, $1,500; o, Berman Ehrenreich; a, J. Brandt... 61st st, n s, 200 e 10th av, brown st ten; c, $24,000; o, Margaret Corrigan; a, C. F. Ridder, Jr; b. not selected. ....146th st, s s, abt 500 e 10th av, eight fr dwell; c, each, about $1,500; o, William Thompson; a, T. M. Clark....Grand av, n s, 250 e 1st st, Woodlawn, office and greenhouse; c, $5,500; o, Peter Roemer & Sons, b, J. Meier & A. Englert.

ALTERATIONS. NEW YORK CITY.

6th av, No. 441, br extension; c, $3,000; o, Estate Sylvester Brush; a, H. Fernbach ...5th av, No. 327, interior alterations; c, $4,000; o, John J. Astor; b, J. Webb & Son and J Downey ...Broadway, Nos. 503, 505, 507, 509 and 511, add one story; c, $25,000; o, Joseph F. Loubat; a, J. B. Snook; b, not selected....Worth st, Nos. 87, 89 and 91, repair damage by fire; c, $7,300; o, Cora and Myra Moffat; a and b, Henry Wallace.

BROOKLYN.

Bushwick av, n e cor Maujer st, fr ten; c, $5,000; o and b, Peter Kaiser; a, G. Hillenbrand....Sandford st, w s, 182.9 n Myrtle av, four fr ten; c, each, abt $2,000; o, George Sutton; a, T. F. Thomas; b, C. Holmer ...North 7th st, No. 258, s s, 150 e 6th st, fr ten; c, $5,000; o, C. H. Meyer; a, Th. Englehardt; b, U. Maurer and M. Metzen.... Bedford av, e s, 20 s Lexington av, twelve br and brown st stores and ten; c, each, $15,000; o, Thomas H. Brush; a, F. E. Lockwood.... Eckford st, w s, 81 s Nassau av, three fr ten; c, each, $4,000; o, John Englis; a, F. Weber; b. G. J. Roberts and S. Randall....Pier near Wall st, near foot Joralemon st, Prentice's middle pier, fr storage shed; c, $12,000; o, Cashman & Co; a, Thos. Reed; b, V. Losee....Willoughby av, s s, 395 w Marcy av, five brown st dwell; c, each, $5,500; o, a and b, Arthur Taylor....Central av, s w cor Jefferson st, fr ten; c, $6,000; o, Henry Eppig; a, Geo. Hillenbrand; b, Wm. Bayer and J. Burger....Leonard st, e s, 33.4 s Nassau av, two fr ten; c, each, $3,500; o, John Englis; a, F. Weber; b, G. J. Roberts and S. Randall. ....Green st. bet Franklin st and Manhattan av, br extension; c, $4,200; o, B. C. R. R. Co; a, A. W. Dickie; b, J. Ashfield & Son.

BUFFALO, N. Y.—Seneca cor Ellicott sts, bl of stores; cost $80,000; o, J. M Richmond; a, M. E. Beebe; b, Bunnell & Rupp ...Richmond av; res; cost $8,000; o, M. W. Tyler; a, R. A. Bethune; b, J. W. Atwood....596 Niagara st, store; cost $7,000; o, R. K. Smither; a, R. A. Bethune; b, B. C. Dean.

BOSTON, MASS.—Old Harbor Point nr Old Harbor st, 1 st filth hois house....333 Chelsea st, 1 fr mechanical b'd'g; o, Alfred B, Weilton; b, Walter D. Johnson....Nonatum st nr Oak sq; 2 in a block, fr dwel; o, Pat. F. Carley: b, Jas. Keefe....Chipman st nr Norfolk st, 1 fr dwel; o, Mrs. A. H. McDonald; b, J. & F. McDonald....5 Newman st, 1 fr dwel and st; o, Henry Grimes; b, Henry Grimes....Washington st nr Neponset st, 1 fr storage of coke; o, Boston Gas Light Co.; b, Benj. Tarbox....Treamont st nr Whitney pl, 1 fr dwel; o, Bernard Krickson; b, McDonald and Tobin....Amandine st nr Washington st, 2 fr poultry houses; o, Timothy Donohue; b, Timothy Donohue... Highland st nr Centre st, 4 fr dwel (in blocks of 2); o, H. B. & L. M. Sargent; b, Richardson Young .. 169 Orchester av, 1 fr photo gallery; o, Arsenio Lopez; b, Anton Oliver....13 West 3d st, 1 fr bakery; o, John T. Shoefiel; b, Chas. R. Palmer....Old Harbor Point nr Old Harbor st, 1 storage of br; o, City of Boston; b, Chas. R. Palmer....Old Harbor Point, nr Old Harbor st, 1 fr blacksmith shop; o, City of Boston; b, Chas. R. Palmer....Old Harbor Point nr Old Harbor st, 1 fr storage; o, City of Boston; b, Thos. Keyes.

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CHICAGO, ILL.—2808 South Park av, 3 story br flats; cost $7,000; o, F. C. Heath; a, Wheelock & Clay; b, F. C. Heath....30 West Indiana st, 3 story br store and flats; cost $9,000; o, Chas. Bobb; a, H. Hansen; b, A. Fogarland....N Clark nr Goethe st, riding school, pressed br and st; cost $22,000; o, Union Riding Club; a, Cudell and Blumenthal; b, Geo. Prussing....62-64 Chicago av, 3 story br st and flats; cost $14,000; o, T. S. Kirkwood; a, Cleveland & Gay; b, not decided....Michigan av below 18th st, mansion, green st laid rough; cost some $60,000; o, Wm. N. Linn; a, Burnham & Root; b, not decided....Washington Boulevard, nr Hoyne av br st, house; cost $17,000; o, Mr. Klingwan; a, Burnham & Root; b, not decided... Prairie av nr 29th st, Queen Anne br house, add gables; cost some $22,000; o, Mr. Burch; a, Burnham & Root; b, not decided....Prairie av nr 20th st, house, wood, with natural wood gables; cost some $22,000; o, C. H. Hutchinson; a, Burnham & Root; b, not decided....Grove Parkway, colonial br house; cost some $18,000; o, W. E. Hale; a, Burnham & Root; b, not decided.

DETROIT, MICH.—205 Larned st, e, br dwel; cost $5,000; o, A. H. Adams....Woodbridge st, factory; cost $18,000; o, Union Chair Co; a, A. C. Varney....Franklin st, factory; cost $10,000; o, National Iron Works; a, A. C. Varney.

PHILADELPHIA, PA.—Wharton e of 19th st, 2 dwel; o, Thos. Marshal ....Moore bet 4th and 5th, 8 dwel; o, A. M. Green....Eustis bet 4th and 5th, 2 dwel; o, A. M. Green....Ried bet 18th and 19th 2 dwel; b, Jos. Stuckey....Garrett bet 18th and 19th 2 dwel; b, Jos. Stuckey....Cedar w of Manayunk ave, dwel; o, J. F. Peasgood....726 19th dwel; o, J. P. Lamberton....133, 135, 137 Sellers, 3 dwell; b, Chas. Gilmore....Center and Schaeffer, 4 dwel; b, W. Garvin ...Buttonwood e of 3d, brewery; b, C. Beitenmiller ...Ward and Wharton, dwel; o, L. P. Simpson....Front and Girard ave, storehouse; b, Michael Magee ...Coral and Taylor, rebuilding factory; o, W. Arrott.

WASHINGTON, D. C.—14th st and W ave, nw, compartment h (extension of the Portland); cost $72,000; o, Edward Weston; a, Cluss & Shultz; b, various parties....5th bet I and K, nw, br h; cost $5,000; o, Hy. Heffner; b, Frank Baldwin....R bet 9th and 10th nw, 2 br h; cost $5,000; o, R. G. Campbell; b, Jno. Corrigan.... 618 Pa. ave nw, br warehouse; cost $15,000; o, Jno. E. Kindale; a, Jno. Fraser....7th bet K and L sw, 7 br dwel; cost $7,000; o, Abraham Fisher.

MISCELLANEOUS.

ARCADE, N. Y.—Res; cost $5,000; o, Isaac Smith; a, Geo. J. Metzger.

BROOKLYN.—The Board of Supervisors resolved to erect an armory to cost $50,000, for the Gatling Battery, etc.....Ovington Bros. will erect a building on Fulton and Clark sts, to cost $50,000....Paul Grenning will build on s e cor Tompkins av and Madison st through to Throop av.

BELLE PLAIN, IA.—A creamery and cheese factory at $6,000, by W. A. Perrin. The town is also to have a pork packing establishment.

CLINTON, IA.—Nothing at present over $5,000, but several dwellings soon to be projected.

CHICAGO, ILL.—A coöperative apart house is to be erected at Superior and Rush sts, by John H. McMurray, the flats being in sets of two floors each. Plans by Cobb & Frost.

FALL RIVER, MASS.—Mrs. Mary B. Young will erect on Rock st, a high school building, to cost $300,000, a gift to the city government. Work to begin at once.

GENEVA LAKE, WIS.—Eastlake fr summer house; cost $15,000; o, John Johnston, Jr; a, Cleveland & Gay; b, Wm Brady.

HARTFORD, CT.—Suffield Creamery bldgs are to be built on the Sikes sites in Crooked Lane.

HYDE PARK, ILL.—On Madison av, ornamental wood cottage; cost some $6,000; o, Frank Osborne; a, Burnham & Root; b, not decided.

ITHACA, MICH.—Plans for a new school house to cost $20,000 are opened here.

KERSVILLE, N. Y.—It is understood that Willis Mould will erect a large brick opera house.

MUSCATINE, IA.—Philadelphia pressed br and cut st house; cost $50,000: o, W. A. Clark; a, Cleveland & Gay.

NEW YORK.—Thom & Wilson have plans in hand for flats at 465 w 47th st, for Gillie & Walker....W. J. Merritt is building brick and stone flats, s s, 129th st, e, 8th ave; o, W. A. Mitchel....77th st, n s, bet 2d and 3d ave, three apartment houses of br st; plans by Charles Baxter....Park & Tilford's new store, Fifth ave, s of 60th st, will be of brick, stone and terra cotta; D. & J. Jardine have the plans....117 st, w of 1st ave; br and stone flats; cost $75,000; o, Jeremiah O'Sullivan; a, R. Resenstock....Augustus Hatfield has planned the erection of brick office, n w cor Beaver and New sts; o, Capt. Wm. Tumbridge; cost $60,000....Apartment house at 8th ave and 116th st ...Geo. Munro filed plans at the Bureau of Buildings last week for two apartment houses of brick and brown stone in 59th st e, Sixth ave; cost each $300,000; a, J. Correja.

PHILADELPHIA.—A new Roman Catholic church is to be erected at 23d and Berks st.

RIVER FOUNT, ILL.—English house in wood; constructional work; cost $20,000; o, E. C. Waller; a, Burnham & Root; b, not decided.

READING, PA.—6 13th st, br dwel; cost $11,000; o, B. A. Neversink; b, C. Frantz. ..1 Muhlenberg st, br fac; cost $9,000; o, Mr. Savage.

UTICA, N. Y.—On Catherine st, br and st bldg for mfg purposes: by H. J. Holbrook & Co.; a, A. J. Simmins. Will be begun May 10.

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Proposals will be received at this office until noon of Tuesday, February 27, 1883, for the construction of a well, engine-house and boiler-house and chimney and for foundations for a tower, and for laying water pipes and appurtenances for the Princeton Water Company, in accordance with the plans and specifications for the same on file in this office. All proposals must be itemized in accordance with the plans and specifications for the same on file in this office. All proposals must be itemized in accondance with the classification prescribed by the Company, and no proposal for doing the work for a gross sum, irrespective of items, will be considered. The Company reserves the right to reject any or all proposals if they are not satisfactory. The plans and specifications may be seen and blank forms of proposals procured at this office, and also at the office of the engineer, J. J. R. Croes, C. E., 63 Bleecker street, New York City. Any person to whom a contract may be awarded will be required to execute a bond with satisfactory security for the amount of 50 per cent. of the estimated cost of the work. The work is to be begun at once, and completed by July 1, 1883.

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PROPOSALS FOR BUILDING A STEAM PROPELLER FOR THE QUARTERMASTER'S DEPARTMENT.

DEPOT QUARTERMASTER'S OFFICE, CORNER HOUSTON AND GREENE STS., NEW YORK CITY, *Feb.* 5, 1883.

Sealed proposals, in triplicate, with a copy of this advertisement attached to each, are invited, and will be received at this office until 12 M., March 7, 1883, at which time they will be opened in the presence of bidders, for the construction of a steam propeller for the United States Quartermaster's Department, for service at Fort Monroe, Virginia. Bids are invited to be made for the vessel complete; also for that portion embraced in specifications No. 1, or that in No. 2, or that in No. 3, only, or those portions in any two of them. Plans and specifications of the same, together with all other necessary information, will be furnished to bidders on application to the Chief Quartermaster on Governor's Island, New York Harbor, the Depot Quartermasters at Washington, Baltimore, Philadelphia and Boston, the Post Quartermaster at Fort Monroe, Virginia, and at this office. Bids are also invited for the work on the basis of supplying out-board condenser, 6-inch, No. 8 copper, or ¼ brass. Also on the basis of the Government supplying the circulating and air pump, and a condenser of one-half the required capacity, the contractor furnishing the other half and making all connections. In either case, if award is made thereon, the specifiations will be changed accordingly. The right is reserved, on the part of the United States, to reject any or all bids. Proposals should be endorsed "Proposals for Construction of Steam Propeller," and addressed to the undersigned.

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Sealed prorosals will be received at this office until 12 M. on the 26th day of February, 1883, for furnishing and delivering at the Treasury Building, Washington, D. C. all the hardware required for the Court House and Post Office at *Philadelphia Pa.*, in accordance with specification and schedule, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

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Sealed proposals will be received at this office until 12 M. on the 28th day of February 1883, for furnishing and fixing in place complete in the Post Office and Sub-Treasury Extention Building at Boston, Mass., the iron work of post office screens, stairways, railings, floor-lights, in accordance with drawings and specifications, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

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PROPOSALS FOR PLASTERING AT TOPEKA, KANSAS.

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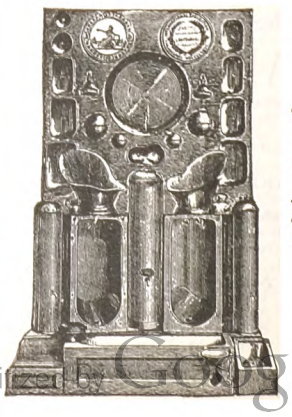

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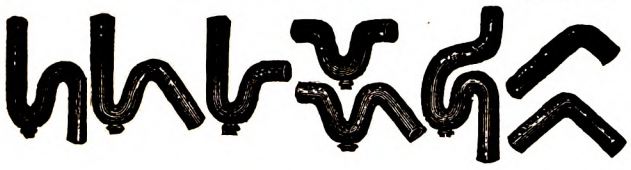

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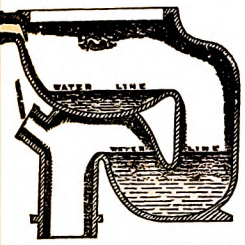

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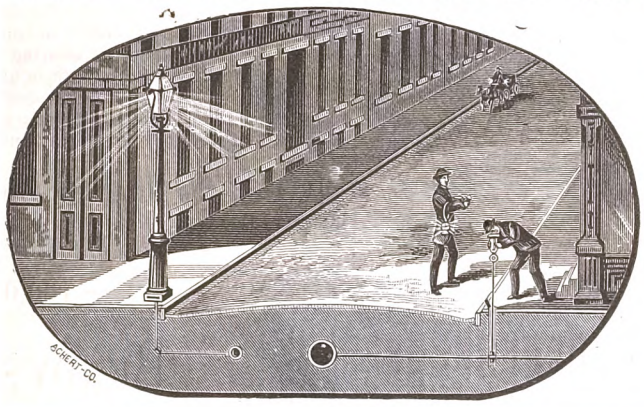

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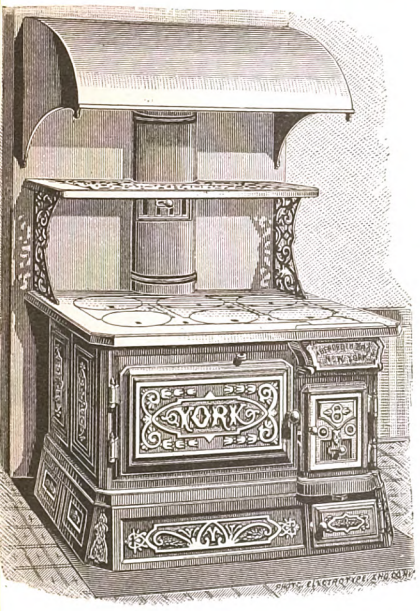

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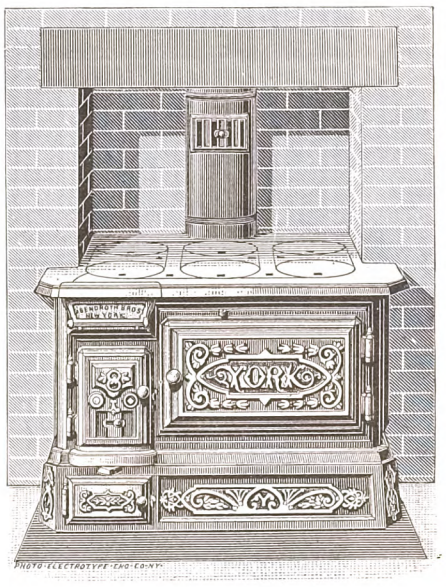

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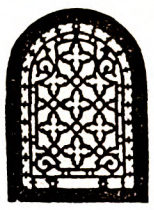

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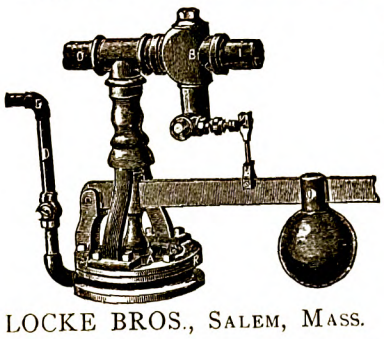

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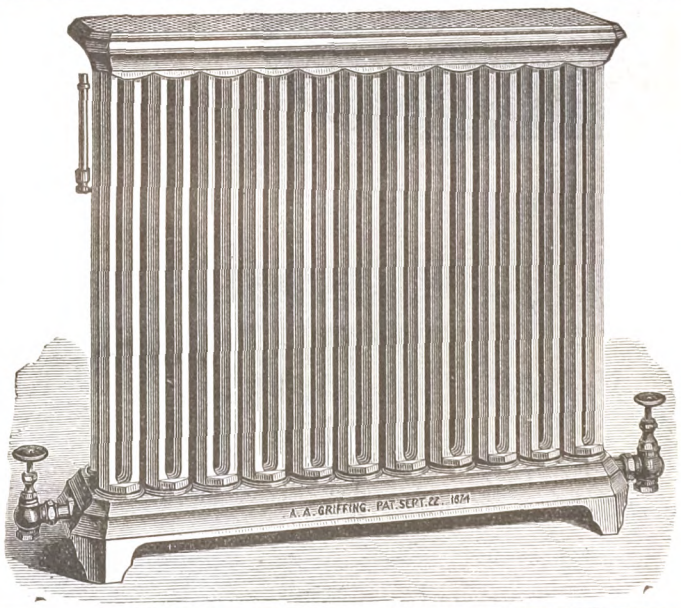

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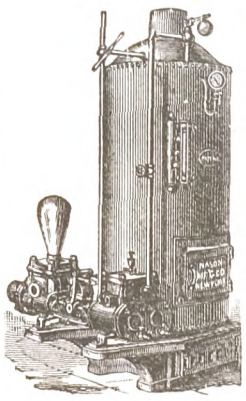

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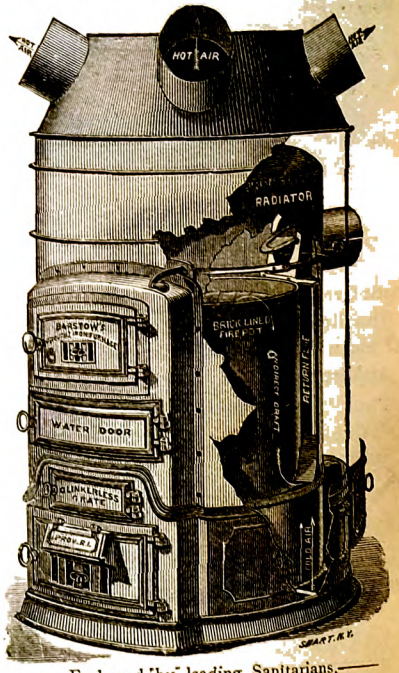

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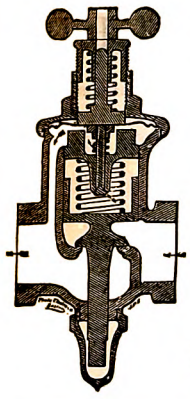

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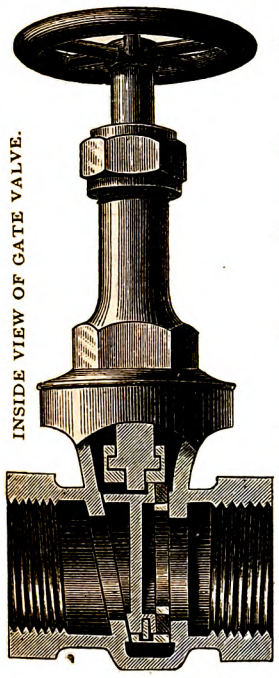

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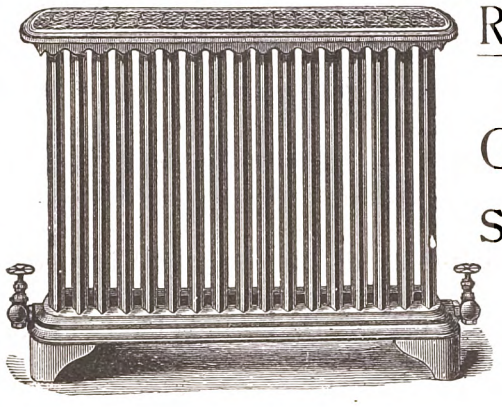

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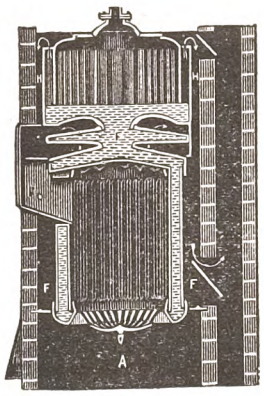

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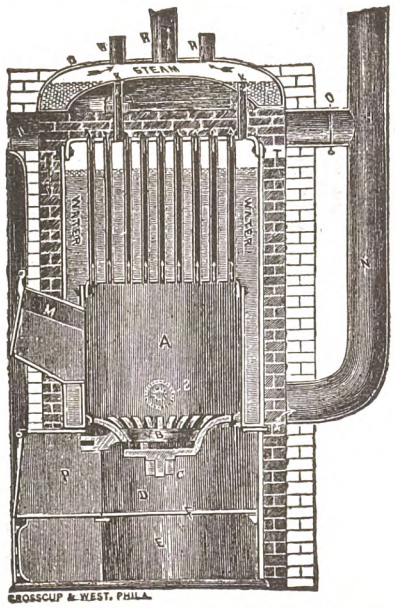

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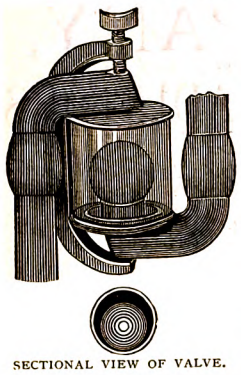

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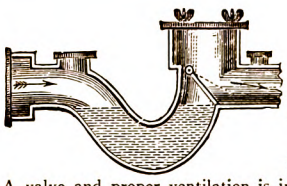

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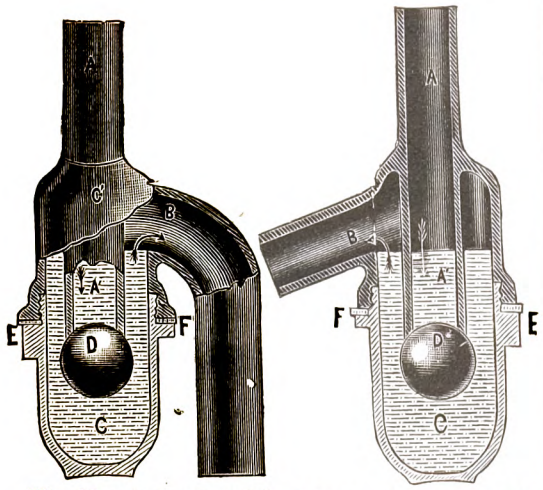

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Every Subscriber should have one of our neat BINDERS to preserve the copies of THE SANITARY ENGINEER for future reference. Price $1.00. Postage paid.

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LUSTRO

POLISHES

Are unrivalled in their excellence, and always give satisfaction.

LUSTRO METAL POLISH,
For Silver, Nickel, &c.

LUSTRO SHOE DRESSING,
For Ladies' and Childrens' Shoes.

LUSTRO STOVE POLISH,
For Manufacturers' and Household use.

LUSTRO BOOT AND SHOE POLISH,
Superior to all others.

Beware of Imitations.

For Sale by Dealers in Plumbing Supplies, and in fact everywhere.

Salt-Glazed, Thoroughly Vitrified

Sewer and Drain Pipe,

MANUFACTURED BY

OTIS & GORSLINE,

At ROCHESTER, N. Y.

New York Office and Yard, { EAST 138TH STREET, MOTT HAVEN.

These pipes are made from a combination of superior clays, are thoroughly VITRIFIED, and SALT GLAZED. Indestructible from the action of all the elements, can be laid perfectly tight, and more durable than iron.

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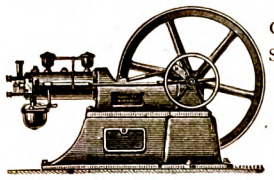
NEW OTTO SILENT GAS ENGINE.



Working without Boiler, Steam Coal, Ashes or Attendance.

SCHLEICHER, SCHUMM & CO.
N. E. Cor. 33d and Walnut Sts.,
PHILADELPHIA, PA.
New York Agency,
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☞ Send for Circular.

IF YOU WANT

A Safe, Economical, Simple and Effective
PUMPING ENGINE,
Send for Illustrated Circular and Price List of the

Rider Hot Air Pumping Engine

TO

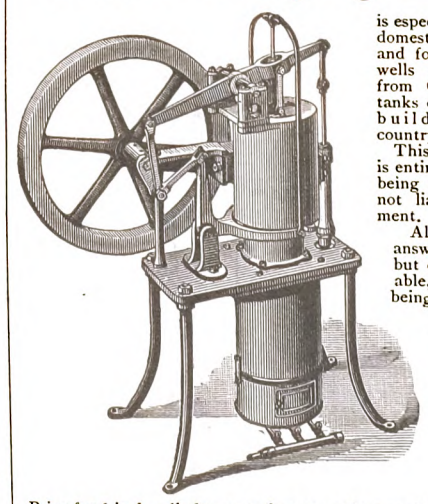
CAMMEYER & SAYER,

93 Liberty Street, New York,
and 20 W. Lake Street, Chicago, Ill.

Please mention this paper.

ERICSSON'S NEW PAT.

Caloric Pumping Engine



is especially intended for domestic use in lifting and forcing water from wells and cisterns, or from Croton pipes, to tanks on upper floors of buildings in city or country.

This pumping engine is entirely safe, no steam being employed, and is not liable to derangement.

All kinds of fuel will answer for this engine, but coal-gas is preferable, the consumption being only 15 cubic feet per hour. Besides, gas is handier and cleaner than coal or other combustibles. Servant girl can operate it.

Price for 6-inch cylinder, pumping 200 gallons per hour 50 feet:
With gas furnace, $210. With coal furnace, $220
Price for 8-inch cylinder, pumping 350 gallons per hour 50 feet:
With gas furnace, $260. With coal furnace, $275
Price for 12-inch cylinder, pumping 800-gallons per hour 50 feet:
With coal furnace only.....$375
Price for duplex 12-inch cylinders, pumping 1,600 gallons per hour 50 feet; with coal furnace only.....$550

MANUFACTURED BY THE

DELAMATER IRON WORKS,

C. H. DELAMATER & Co., Proprietors,
No. 10 Cortlandt Street, New York City.

Creque, Ronalds & Co.

54 CLIFF STREET, N. Y

Manufacturers of

COPPER BOILERS,

With or without CREQUE'S PATENT CIRCULATION.

Foot and Seat Tubs,
Closet Pans,
Air Chambers,
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Copper Balls,

TINNED AND PLANISHED

SHEET COPPER.

Every Pattern, Size, Weight and Quality of

COPPER, ZINC AND NICKEL PLATED

BATH TUBS.

GALVANIZED

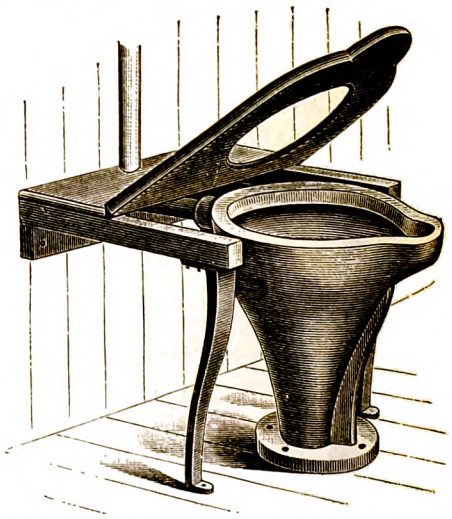
IRON RANGE BOILERS,

WITH OR WITHOUT

CREQUE'S PATENT CIRCULATION

MADDOCK'S

DELUGE HOPPER,



WATER CLOSET and LIP URINAL

COMBINED,

WITH FLUSHING RIM.

Designed for Hotels, Factories, Stores, Public Buildings, Tenement Houses, Hospitals, Railroad Depots, &c.

Can be seen in operation at our New York Warerooms.

Thomas Maddock & Sons,

MANUFACTURERS OF

Sanitary Specialties in Earthenware,

Besides all the staple wares for Plumbers' use.

All our goods guaranteed Equal to the Best Imported Ware

POTTERIES: TRENTON, N. J.
Warerooms: 273 PEARL ST., NEW YORK.
W. W. PERRINE, Manager.

☞ *Send for Circular.*

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THE BRIGHTON.

There is a tendency in some quarters to demand a Hopper form of Water Closet and to dispense with what are called mechanical parts. This would be desirable, if the so-called mechanical parts did not secure advantages in the matter of a large body of water in the bowl, not otherwise obtainable, without resorting to methods not everywhere applicable or sufficiently demonstrated as practicable.

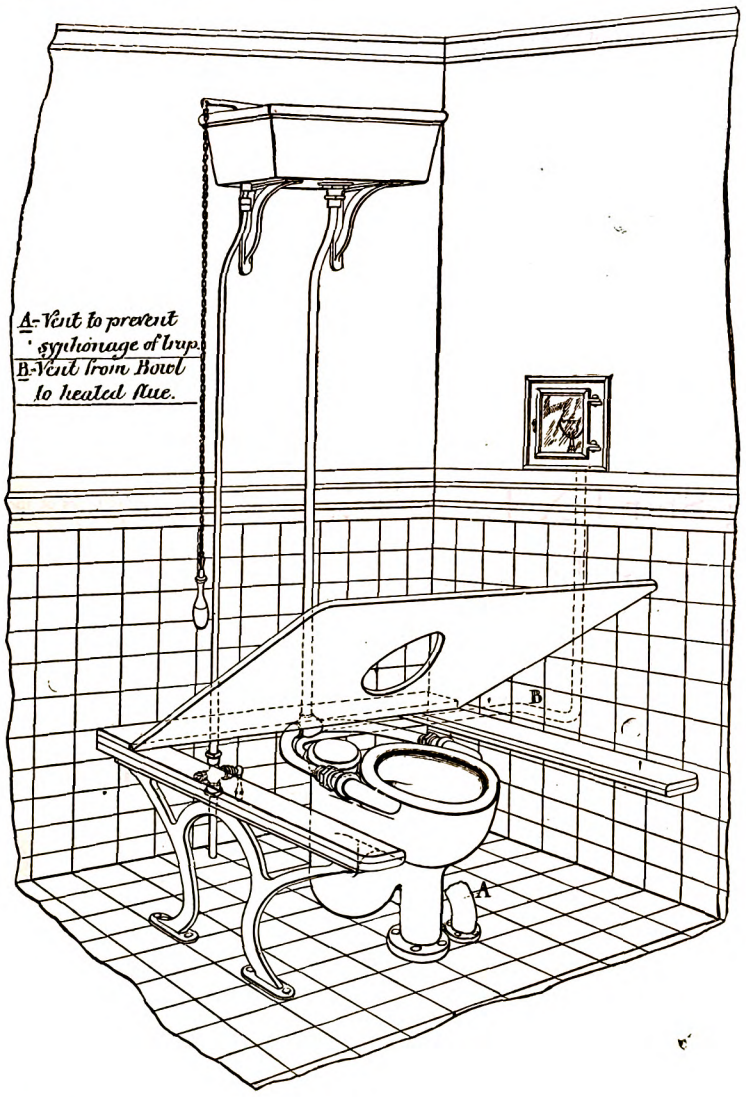
The Brighton Closet here illustrated is, we believe, the best compromise yet devised between the Hellyer form on the one hand and the Hopper on the other.

By examining the sectional cut, it will be seen that the bottom of the bowl is covered with water, while the flush and shape of the bowl is such that the trunk on the back is kept clean.

It is attractive in appearance, being all in one piece, of white earthenware.

The pipe *B*, connected with the trunk, can be run into a heated flue when desired.

These Closets have had a large sale in England during the past four years. We have had them in use in our factory nearly two years—and we now offer them to those who prefer a different form of Water Closet than the *Hellyer, which, by the way, does not, in a single instance, so far as we know, fail to satisfy those who have them in use.*



This will be known as

"Meyer, Sniffen & Co.'s Water Closet Apparatus No. 30."

Persons interested are invited to call at our warerooms, Nos. 46 and 48 Cliff Street, New York, or at No. 1 Pemberton Square, Boston, and examine this and other specialties that we have fitted up with water attached, including THE ROYAL PORCELAIN BATH, THE MODEL PORCELAIN SLOP HOPPER, THE HELLYER CLOSET AND HOPPER, THE THOADS HOPPER, DOHERTY SELF-CLOSING COCKS, FULLER FAUCETS, etc.

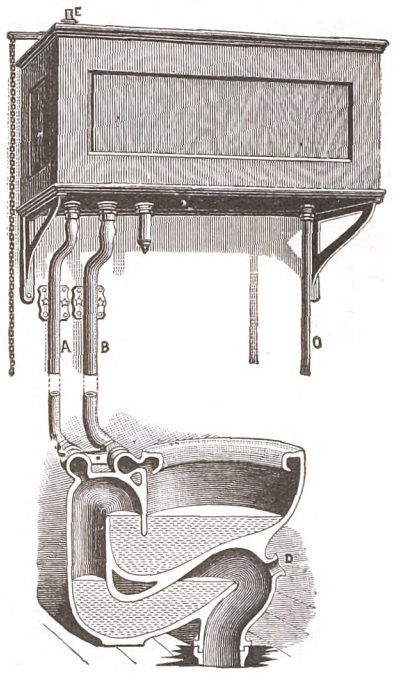
MEYER, SNIFFEN & CO.

BOYLE'S PATENT

Tidal Wave

WATER CLOSET.

Patented in all principal countries.



SECTIONAL VIEW.

A—Air Pipe. C—Supply Pipe.
B—Flush Pipe. D—Vent.
E—Connection for Fresh Air Pipe.

A New Departure in Water Closets.

The closet is made of one piece of earthenware, and supplied with Waste-Preventing Cistern coming under the lowest rate of taxation, as adopted by the Department of Public Works of New York.

Wherever in use, the closet has given entire satisfaction, and is recommended by leading authorities on sanitary matters as coming up to the requirements of a first-class appliance of its kind, being

Simple and Positive in Operation, Clean in Use and Perfect in a Sanitary point of view.

Write for Descriptive Circulars.

Further attention is called to

BOYLE'S PATENT

Universal Waste Preventing Cistern

AND

COMBINATION LEVER.

DISPENSING WITH SERVICE BOX.

The Cistern Valve insures both a copious preliminary and after-flush for either Hopper or Cistern Closet, the importance of which is well understood by every plumber. The flush can be regulated from one to four gallons.

Cisterns furnished, Cast Iron and Copper-lined.

We manufacture all the Carr Specialties in

WATER CLOSETS, HOPPER CLOSETS, SWINGING URINALS, BATH AND BASIN SUPPLIES, Etc., Etc.

and will send our descriptive catalogue to Architects and the Trade upon application.

HENRY HUBER & CO.,

85 BEEKMAN STREET.

Western Branch, 130 Lake Street, Chicago, Ill.

H. A. ALLYN & CO., Managers.

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Cast Iron Soil Pipe
AND
FITTINGS
A Specialty by
ALFRED BRADY,
Iron Founder.

Foundries: West 55th Street, bet. 10th & 11th Ave.

Salesrooms: 141 Spring Street, and 1481 & 1483 Broadway,

NEW YORK.

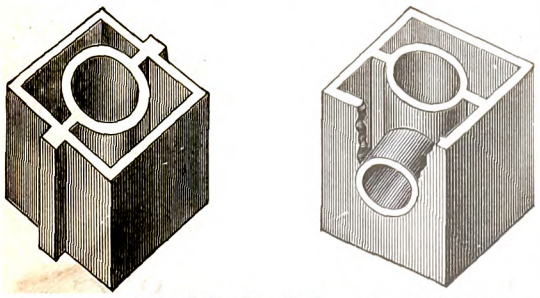
Send for Catalogue and Price Lists

Thos. Gibson & Co.
General Agents, and Sole Manufacturers for the West, of
JENNINGS'
Patent Water Closets
The Original and most Reliable SANITARY WATER CLOSET in the World.
200 Vine Street, Cincinnati, O.

GET THE BEST!

E. Stebbins M'f'g Co.,
SOLE MANUFACTURERS.
STEBBINS & BRIGHTWOOD
PLUMBERS' BRASS WORK.
BRIGHTWOOD, MASS.

PATENT CHIMNEY
AND
VENTILATING FLUE COMBINED.



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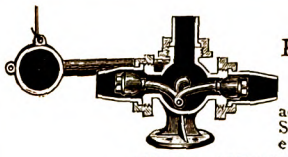
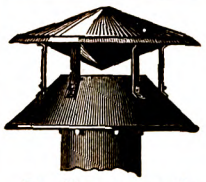


THE
KELLY STOP & WASTE
COCK,
adapted to all Plumbing Fixtures, Self-acting Water Closets, Urinals, etc. Send for Catalogue.

THOS. KELLY & BROS.,
186 Dearborn Street, Chicago, Ill.



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VENTILATORS
AND CHIMNEY CAPS.

A powerful and rapid exhaust Ventilator. Simple, cheap and effective.

FOR VENTILATING SOIL PIPES, WATER CLOSETS, ETC. ODORS FROM SEWERS ARE CARRIED OFF. Working Models mailed on receipt of 20 cents. Large sizes for ventilating Schools, Halls, Hospitals, etc.

E. VAN NOORDEN & Co., 380 Harrison Ave., BOSTON, MASS.

Send for Circular and Price List.

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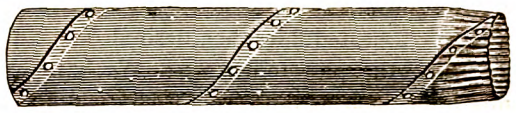


Having abandoned the manufacture of Locked Seam pipe we are now offering *SPIRAL SEAM RIVETED PIPE AT THE SAME PRICE AS WE FORMERLY SOLD THE LOCKED SEAM.* It is in every respect stronger, better, and more reliable. Manufactured in lengths of 10 feet and under. A full assortment always on hand, as also of adjustable elbows.

ABENDROTH AND ROOT MAN'F'G CO.
28 Cliff Street, New York

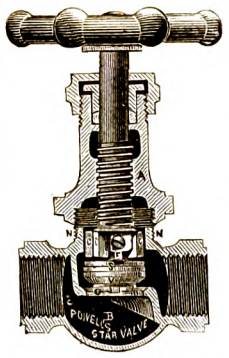
RITCHIE'S PATENT
SPIRAL LOCK-SEAM PIPE,

Of Galvanized Iron, Tin, Copper, etc.,

Air-tight Seams. Handiest Coupling.

FOR VENTILATION. Considered the *best* by Engineers and Plumbers, as it is the Neatest, Strongest, Cheapest, most easily Fitted, and made of the Best of Materials. A full stock, with Elbows, etc., always on hand, in sizes from 1 to 6 inches. BOSTON SPIRAL TUBE WORKS, 250 CHARLES ST., BOSTON, MASS.

Many Steam Fitters and Machinists are of the opinion that the
POWELL PATENT
Regrinding Star I X L
AND
Eagle Globe Valves



are the very best in use. They are made extra heavy for Steam Boat use. Every valve warranted for one year if handled and used with ordinary care.

POWELL'S PAT. LUBRICATORS insure a great saving in oil.

For sale by steam fitters and dealers in supplies.

Specifications should call for
The Powell Star Valves.
WM. POWELL CO.,
Manufacturers,
245 W. 5th St., Cincinnati, O.

Eastern Agents: STEPHENS & KELLAM, 93 William St., N. Y.

"THE MURDOCK."

Of the many Patent Hydrants that have been put on the market, none have had the sale, been so durable, or maintained their high reputation as the

"Murdock" Anti Freezing Hydrant.

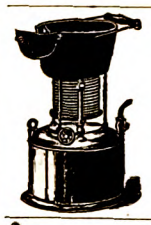
It has many imitations, has often been undersold, but never equalled in the estimation of those able to judge from experience. We know of their being in use nine years with severe treatment without requiring repairs.

Patentees and Sole Western Manufacturers,
J. G. MURDOCK & CO.,
195 West Fifth St., Cincinnati, O.

We will be glad to send, if requested, illustrated circulars, describing the Hydrant Street Washer, and Combination Hitching Post and Street Washer.

Chas. Butcher & Co.
MANUFACTURERS OF
PARQUET FLOORS
AND
The Boston Polish,
or Hard-Wax Finish.
Office, 171 Tremont St., BOSTON, MASS.
The Boston Polish is the only thing really adapted to Polishing Hard Wood Floors.

The Boston Polish is recommended by leading architects in Boston for both inside finish and floors.



Plumber's Furnace.
Several improvements have been made lately.

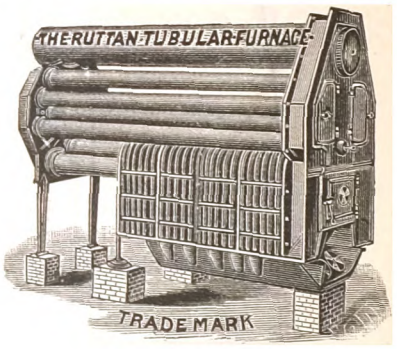
Send for full descriptive circular and price list.

C. GEFRORER,
248 N. 8th Street, Philadelphia.

James Bulger, Jr.,
(Successor to J. COLEMAN & CO.)
(Late Pollock & Conner)
25 CENTRE STREET, NEW YORK.
Sole Manufacturers of
H. T. COLEMANS'
Patent Anti-Freezing and other
LIFT AND FORCE
PUMPS.
COCKS, ETC.

Dealer in Plumbers' Supplies all kinds of Brass Work used by Plumbers and Gas Fitters.

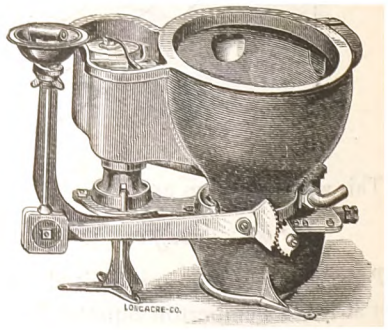
Ruttan Manufacturing Co.



Manufacturers of the
Ruttan Tubular Furnaces.
Special attention given to warming and ventilating school and other public buildings.

60-*Page Illustrated Catalogue* sent free on application. Call and see our latest improvements in
VENTILATION.
No. 68 LAKE STREET, CHICAGO.

VICTOR
SANITARY VALVE
WATER CLOSET.



A perfect seal against Sewer Gas. Absolutely pure. The Outlet Valve of Closet is provided with double rubber packing with feather edges, which effectually prevents waste of water from the Basin. Send for descriptive Circular.

COOPER, JONES & CADBURY
PHILADELPHIA, PA.

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DEMAREST'S

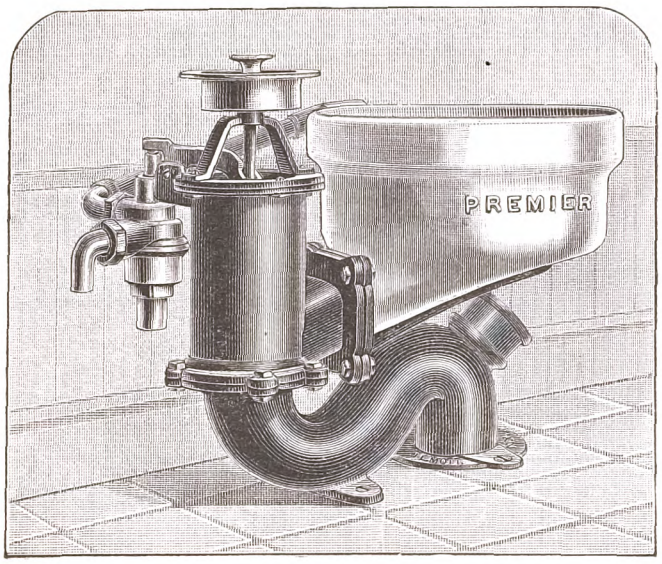
Patent VALVE WATER CLOSETS,

MANUFACTURED BY

THE J. L. MOTT IRON WORKS,

Nos. 88 and 90 Beekman Street, New York.

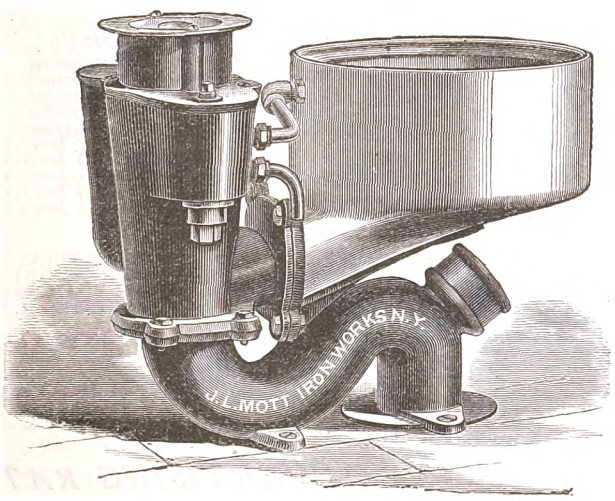
We take great pleasure in calling the attention of our customers and all interested in fine sanitary work to the above water-closet, which is in all respects the same as our "Hygeia" Cistern Closet, only it is fitted with a large Valve (one inch waterway) suited to all pressures.



The valve is of the simplest kind, reliable and perfect in operation; it is positive in action, being operated by lever as shown in cut. The flushing rim ensures the wash of every part of the closet, and what is a most important feature, this is accomplished almost entirely without noise.

THE "PREMIER."

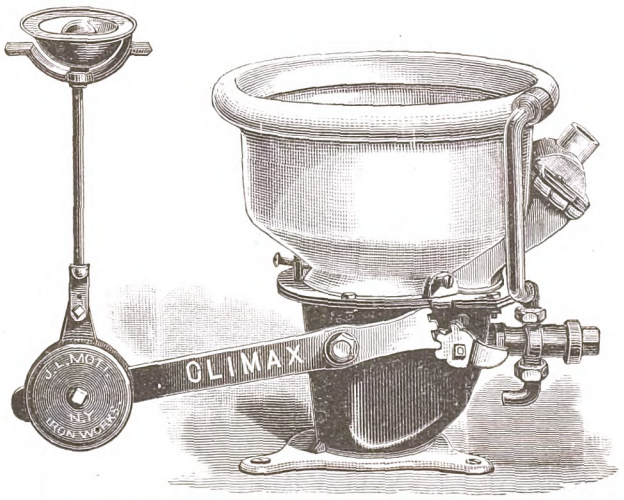
SIDE-OUTLET VALVE CLOSET.



THE "DEMAREST."

SIDE-OUTLET VALVE CLOSET.

The "Demarest" is undoubtedly the most popular closet of the kind in the market. Its large and largely increasing sale being proof of its superiority where a first-class article is required at a moderate price.



THE "CLIMAX."

DIRECT-OUTLET VALVE CLOSET.

The above is a very reliable direct-outlet closet, and has given good satisfaction wherever it has been used. The outlet is full four inches, which is an important feature in this style of closet.

We furnish Enameled Iron or Imported All-porcelain Slop Safes to fit all the above Closets.

COMPLETE ILLUSTRATED CIRCULARS WITH PRICES, SENT ON APPLICATION.

ALL OUR SANITARY SPECIALTIES ARE FITTED UP WITH WATER ATTACHED,

And may be seen at our Warerooms, Nos. 88 and 90 Beekman Street.

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DURHAM HOUSE DRAINAGE COMPANY,

Office, 187 Broadway, New York.

Manufacturers of the

DURHAM SYSTEM OF SCREW JOINT IRON HOUSE DRAINAGE.

C. W. DURHAM, President,
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TRUSTEES:—JOSEPH P. DAVIS, Director Am. Soc. C. E., formerly City Engineer of Boston; RUDOLPH HERING, M. Am. Soc. C. E.; Dr. C. FAYETTE TAYLOR; HENRY G. PROUT, M. Am. Soc. C. E.; WILLIAM H. BOARDMAN, Manager *Railroad Gazette*; C. W. DURHAM, M. Am. Soc. C. E.; STEPHEN VAIL; FLOYD B. WILSON; CHAS. P. WHITNEY

PLACED IN NEARLY 2000 BUILDING.

Permanently Perfect Drainage Construction.

Illustrated Pamphlet sent on application.

DANIEL T. BOSTELL,

Sanitary Engineer.

(Inventor of the Brighton Excelsior Valveless Water Closets)

Makes sanitary inspections of buildings, and may be consulted about work in any part of the kingdom.

18 & 19 Duke St., Brighton.
And 8 Golden Lane, London. E. C., England.

CHAS. F. WINGATE, Consulting Sanitary Engineer. Professional advice regarding Plumbing, Drainage, Heating and Ventilation. 119 Pearl St., Hanover Sq., N. Y.

JOHN TRAGESER STEAM COPPER WORKS,

Established 1850.

447 to 455 W. 26th St. —New York.— 273 Pearl Street.

Manufacturers of Copperwork for Plumbers, Distillers, Sugar Houses, Chemical Works, Essential Oils.

GALVANIZED IRON BOILERS, A SPECIALTY.
ALL SIZES CONSTANTLY ON HAND.

E. P. COBY & CO.,

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93 & 95 William Street,

NEW YORK.

THE SANITARY ENGINEER *is printed at this Establishment, where parties can have volumes bound uniforml at short notice.*

THE RUSSELL VALVE has stood the test for nine years. It has a composition movable disk that usually will last about two years, and can any time be readily replaced.

MANUFACTURED ONLY BY

T. R. McMANN & BRO.,

Manufacturers and Dealers in

WROUGHT IRON PIPE AND BRASS AND IRON FITTINGS FOR WATER AND STEAM.

56 *and* 58 *Gold Street, New York.*

Send for Descriptive Catalogues, with names of prominent buildings where used.

PECK BROS. & CO.,

MANUFACTURERS OF

BRASS COCKS

For WATER, GAS and STEAM.

No. 73 BEEKMAN ST., N. Y.

[Works, New Haven, Conn.]

THIRTY-EIGHTH ANNUAL REPORT

OF THE

NEW YORK LIFE INSURANCE CO.

OFFICE, Nos. 346 and 348 BROADWAY,

JANUARY 1, 1883.

Amount of Net Cash Assets, January 1, 1882, - $45,130,006.86

REVENUE ACCOUNT.

Premiums	$9,604,788.38		
Less deferred premiums January 1, 1882	452,161 00—	$9,152,627.38	
Interest and rents (including realized gains on real estate sold)	3,089,273.21		
Less Interest accrued January 1, 1882	291,254.80—	2,798,018.41—	$11,950,645.79
			$57,080,652.65

DISBURSEMENT ACCOUNT.

Losses by death, including Reversionary additions to same		$1,955,292.00	
Endowments matured and discounted, including Reversionary additions to same		427,258.95	
Annuities, dividends, and returned premiums on cancelled policies		3,827,758.76	
Total paid Policy-holders	$6,210,309.71.		
Taxes and re-insurances		234,678.27	
Commissions, brokerages, agency expenses and physicians' fees		1,332,038.38	
Office and law expenses, salaries, advertising, printing, &c		385,111.18—	$8,162,137.54
			$48,918,515.11

ASSETS.

Cash in bank, on hand, and in transit (since received)	$1,276,026.67	
Invested in United States, New York City and other stocks, (market value, $19,953,956.52)	18,072,074.81	
Real Estate	4,133,065.13	
Bonds and mortgages, first lien on real estate, (buildings thereon insured for $17,950,000.00 and the policies assigned to the Company as additional collateral security)	19,306,940.16	
Temporary loans, (secured by stocks, market value, $5,191,139.50)	4,313,000.00	
*Loans on existing policies, (the reserve held by the Company on these policies amounts to $2,690,961)	494,032.23	
*Quarterly and semi-annual premiums on existing policies, due subsequent to January 1, 1883	540,555.91	
*Premiums on existing policies in course of transmission and collection	394,395.19	
Agents' balances	62 424 95	
Accrued interest on investments January 1, 1883	326,000,06—	$48,918,515.11
Excess of market value of securities over cost		1,881,881.71

** A detailed schedule of these items will accompany the usual annual report filed with the Insurance Department of the State of New York.*

CASH ASSETS, January 1, 1883, - - - - $50,800,396,82

APPROPRIATED AS FOLLOWS:

Adjusted losses, due subsequent to January 1, 1883		$351,451.21
Reported losses, awaiting proof, etc		138,970.23
Matured endowments, due and unpaid, (claims not presented)		53,350.43
Annuities, due and unpaid, (uncalled for)		6,225.86
Reserved for re-insurance on existing policies; participating insurance at 4 per cent. Carlisle net premium; non-participating at 5 per cent. Carlisle net premium		43,174,402.78
Reserved for contingent liabilities to Tontine Dividend, Fund, January 1, 1882, over and above a 4 per cent. reserve on existing policies of that class	$2,054,244.03	
Addition to the Fund during 1882 for surplus and matured reserves	1,109,966.00	
	$3,164,210.03	
DEDUCT—		
Returned to Tontine policy-holders during the year on Matured Tontines	1,072,837.87	
Balance of Tontine Fund January 1, 1883		2,091,372.16
Reserved for premiums paid in advance		35,782,36
		$45,851,555.03

DIVISIBLE SURPLUS at 4 per cent., - - - - - - - 4,948,841.79

Surplus by the New York State Standard at 4½ per cent., estimated at - 10,000,000.00

From the undivided surplus of $4,948,841 the Board of Trustees has declared a Reversionary Dividend to participating policies in proportion to their contributions to surplus, available on settlement of next annual premium.

During the year 12,178 policies have been issued, insuring $41,325,520.

NUMBER OF POLICIES IN FORCE,		AMOUNT AT RISK.	
Jan. 1, 1879,	45,005	Jan. 1, 1879,	$125,232,144
Jan. 1, 1880,	45,705	Jan. 1, 1880,	127,417,763
Jan. 1, 1881,	48,548	Jan. 1, 1881,	135,726,916
Jan. 1, 1882,	53,927	Jan. 1, 1882,	151,760,824
Jan. 1, 1883,	60,150	Jan. 1, 1883,	171,415,097

DEATH-CLAIMS PAID.		INCOME FROM INTEREST.		DIVISIBLE SURPLUS AT 4 PER CENT.	
1878,	$1,687,676	1878,	$1,948,665	Jan. 1, 1879,	$2,811,436
1879,	1,569,854	1879,	2,033,650	Jan. 1, 1880,	3,120,371
1880,	1,731,721	1880,	2,317,889	Jan. 1, 1881,	4,295,056
1881,	2,013,203	1881,	2,432,654	Jan. 1, 1882,	4,827,036
1882,	1,955,292	1882,	2,798,018	Jan. 1, 1883,	4,948,841

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WAS IT SEWER GAS?

The daily press mention an explosion which occurred recently in the cellar of a house in Cincinnati, which stood on the border of the inundated district. Several persons entered the cellar with a lighted candle, and the explosion followed, resulting in the death of three inmates and the serious injury of others. The explosion was attributed to "fire damp or sewer gas."

As everyone knows, sewer gas has a bad enough reputation without attributing to it accidents in which it is not probable that it played any part.

There are certain conditions under which the gases in sewers might produce explosive mixtures, but such conditions have not often been found, and we do not believe exist to-day. It is a mistake to speak of "fire damp" and "sewer gas" as synonymous terms, or even to imagine that "fire damp" forms any considerable part of sewer gas.

It is impossible to give any fixed composition for sewer gas, inasmuch as it varies with the amount of gases disengaged and the degree of perfection of the ventilation of the sewers. Moreover, the composition of the gas in any one sewer would vary greatly at different times. In some cases it would vary little from the composition of the outside air. Under ordinary circumstances it would contain more or less carbonic acid, and a little sulphuretted hydrogen, and marsh gas or carburetted hydrogen. In nineteen analyses made in 1829, by Gaultier de Claubry of the gas in the old Parisian sewers, the greatest impurity consisted of 3.4 per cent. of carbonic acid, and 1.25 per cent. of sulphuretted hydrogen. In sewers of good construction the carbonic acid would probably not exceed 1 per cent., and the sulphuretted hydrogen and marsh gas, if present, would be found in much smaller quantities.

When refuse matter is allowed to decompose *without access of air*, marsh gas will form a large part of the resulting gases.

Dr. Letheby, in his report of the examination of the London sewers in 1866, which were practically unventilated cesspools, states that he found as high as 88 per cent. of marsh gas in the sewer gas, and that it was frequently ignited by the candles in the hands of the workmen.

Dr. Angus Smith in his report on "Disinfection and Disinfectants," stated that the gas arising from the sewage matter at the bottom of the Medlock contained 5.35 per cent. of nitrogen, 5.84 per cent. of carbonic acid and 88.81 of marsh gas. He adds, however, that the matter "was extremely putrid, and the water over it putrid also, and therefore free, or nearly so, of oxygen."

These two cases are exceptional and cannot be taken as representing the composition of sewer gas. It is seldom that sewers are not provided with means for a more or less perfect ventilation, in which case the excess of oxygen would prevent any considerable formation of marsh gas.

It is clear, therefore, that it is unwise to attribute an explosion to sewer gas without some knowledge of the existing conditions.

The inundation at Cincinnati would naturally interfere with the proper flow of the sewers, but it is difficult to see how under these conditions—supposing the sewer was not ventilated at all—at this season of the year, and in so short a time, enough marsh gas could be disengaged to produce an explosive mixture with the surrounding air.

On the other hand the fracture of a gas pipe or main would be nothing strange under the circumstances, and although the supply of gas had ceased, the pipes would still contain it, and being forced back as the water rose, it would find an outlet at the first break, and soon form an explosive mixture.

In the case of the sewer gas we have a mixture in which the combustible portion very seldom reaches an amount sufficient to produce an explosive compound, to say nothing of a further dilution with air. With illuminating gas, however, the entire mixture is combustible, and consequently would require a larger admixture of air before becoming explosive.

It seems most reasonable, therefore, to attribute the explosion in question to illuminating gas and not to sewer gas, and the same may be said of the large majority of explosions reported from time to time.

NEW YORK'S WATER SUPPLY.

No. V.

THE SUPPRESSION OF WASTE.

In 1851 Manchester, Eng., received for the first time an abundant supply of water from its new water works, and has since been able to maintain a constant service. The managers realizing the importance of controlling the character of the plumbing work and fittings, attempted, like the authorities of Norwich, to stop the waste, acting under the authority conferred by the water works clause act of 1847, but it was found inadequate and they were unsuccessful. In 1858, 1860 and 1867, however, the corporation secured additional authority from Parliament and has since effectually controlled these matters. Manchester is therefore to-day a city where the

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testing of fittings, and constant and systematic inspection of plumbing is solely relied on to restrict the waste of water.

We believe an average pressure of upwards of forty pounds to the inch is maintained, and yet under the admirable management there prevailing the amount of water delivered for all purposes is only about twenty imperial gallons daily (about twenty-four U. S. gallons). Thirteen of this amount is used for domestic purposes and seven for manufacturing, street watering, and fires. The authorities also claim that they maintain a sufficient pressure to be able to be put out fires in the highest buildings without the aid of fire engines. It should be stated, however, that water closets are not universal in Manchester, the tub system for the removal of excreta being relied on by a portion of the population. They use meters in all buildings except dwellings, and exempt them on sanitary grounds; where meters are used an ample supply for flushing water closets is insisted on. The meters used are all tested, and it is claimed that the variation does not exceed two per cent.

Mr. T. H. G. Berry, the superintendent, to whom we are indebted for much information, has stated that he preferred house-to-house inspection, because it enabled the authorities to keep informed as to the use to which water, not otherwise reported, was put, and the increased revenue from these discoveries amounted to about 1,200 pounds sterling a year, which, with the fees received for stamping fittings practically paid the cost of the entire inspecting and testing staff.

Plumbers are supposed to do the work in a building in accordance with the prescribed rules. When a building is fitted up and it is desired to have the water turned on, the plumber sends in a form filled out describing the character and number of fittings used. An inspector is then sent to see if they are all stamped and the work done in accordance with the regulations; if so, he makes a report to that effect. If not satisfactory the inspector writes to the plumber and tells him what is needed to secure his approval of the work. and the matter rests in the inspector's hands until his demands are complied with. The good faith of this inspector is tested by a chief or second inspector who has the first inspector's reports to verify.

The second inspector is in a different office from the first; he takes the reports for verifica- from the books in that office. If the first inspector is satisfied that the fittings and work in a building are all right, he makes an agreement with the owner as to the water rate to be paid, it being his business to find the owner and get the agreement signed, if the building is to be then occupied. Quarterly rentals are charged to the tenant and weekly rentals to the landlord. It will be obvious that from the responsibility placed on these inspectors they must be men of integrity and intelligence, a combination we regret to say not always found in men too often selected for such positions in this city.

There are eight so-called first or plumbing inspectors who make these agreements, and there are two second or supervising inspectors who only visit the building after the water is turned on, to see if any change has been made, waste exists, and if the proper rental is being paid. If an extra water closet is put up or any change made and not reported to the water office the offending plumber is brought before the water committee, and either fined or his name stricken off the list.

Of the waste preventing staff for house-to-house inspection there is one regular member, and the others are used as time from new work permits.

[To be Continued.]

THE COMPENSATION OF WATER WORKS.

A director of the New River Company, which supplies a part of London with water objects in *The Times* to a remark made by that paper regarding the water companies, that "they are entitled to nothing more than the price of their services, according to the amount supplied, exactly like the butcher, the baker, or the gas company," and says that the cases are not parallel, because the water companies furnish large quantities of water grates, for fire extinguishing. The director says he has never met with a butcher or baker who would supply 4,000 pounds of bread or meat for nothing, nor a gas company who would supply either a public or a private body with a million or two cubic feet of gas for the asking. It seems to us that *The Times* is right in the view it takes of this matter, if it means that a water company should be paid for its services in the same manner as any other dealer in a commodity of universal use, that is, reimbursed for its outlay and also remunerated for its risk and the use of its capital. The butcher or baker is not paid the actual cost of the meat or bread he furnishes. He receives enough to pay him for the spoiled meat or the bread which was sour. So the water company must be paid for what the consumers waste or the public uses. If the public will not pay for water used for extinguishing fires, the private customers of the company have to bear the expense. The public authorities do not think of this fact when they demand from a water company that it shall supply water for the public uses without charge, as is done in many instances. There are certain uses of a public water supply which directly benefit property rather than individuals, and property should pay its proportion of the cost of furnishing water. Where the public own the works, it appears from some statistics which have been collected that property actually pays in taxes for interest, etc., about one-third of the expenses of the works, and it will easily be seen that the lower the water rates, the greater the proportion of expense which is borne by property, and that where municipal authorities ease up on the taxpayers by compelling a company to furnish public water free, they burden the individual who is obliged to use the water for private purposes and force him to pay more than his proportion of the expense.

An equitable adjustment of the proportion between the share which should be borne by property and that which the consumer should pay, has not yet been attempted by competent persons, so far as we are aware. We commend the subject to the careful consideration of experienced managers of water works.

The New York *Herald* did a characteristic and generous thing last Sunday in announcing that it had opened a subscription list for the sufferers from the floods in the Ohio Valley and heading the list with five thousand dollars. While our sympathies are excited by the reports of present enormous losses of property, and considerable loss of life, and of the homeless and destitute thousands, we may remember that this does not exhaust the possible evils which may fall upon that section of the country. With subsidence of the waters, and the return of the inhabitants to their normal life will begin the prospect of a terrible evil, toward which all sanitarians are looking with dread. Will Cincinnati, Louisville, and the other cities which have been submerged, escape the pestilence which the summer heats may develop out of the wet soil, with damp houses and disorganization generally to foster their outbreak? Let us hope so, and while hoping so, do what we can to relieve the distress of the afflicted cities.

If the terrible calamity will force upon the politicians of Cincinnati the conviction that their health organization must be changed, and that result can be secured, one good purpose at least will have been served

---

The Executive Committee of the American Public Health Association met in Washington February 16. The time for the next meeting of the Association, which is to take place in the city of Detroit, was fixed for the second week in November. The principal subjects selected for discussion at this meeting, and with regard to which papers are requested, are the collection and publication of vital statistics, the causes of malaria, the preservation and adulteration of food including legislation relating to it, and house drainage.

The Sundry Civil Appropriation Bill is now before the Committee of Appropriations of the House of Representatives. It is understood that it appropriates $10,000 for the salaries and expenses of the National Board of Health, but allows nothing for investigations, the publication of a Bulletin, emigrant, inspection or refuge quarantine stations. It is probable that this will be amended either in the House or Senate, but as it now stands it shows that the House Committee has very little respect for the opinions of sanitarians.

The sanitary condition of the public schools is considered of such consequence by Health Commissioner Raymond, of Brooklyn, that he has assigned Dr. W. E. Griffiths, sanitary inspector of the Health Department, to the special duty of examining the school houses. His report of the condition of things in public school No. 15 (at the corner of Third avenue and State street), which he submitted to the Commissioner last week, is not a pleasant one. He says:

"On the first floor (which was originally used as a play ground) there is now one department, comprising 432 children. The ceilings are low (ten feet), the windows much smaller than in the upper stories. The cubic space allotted to 404 children and ten teachers is 41,600 feet, or a small fraction of over 100 cubic feet of air for each. The only means of adding to the air supply is by opening the windows and doors, thus creating drafts injurious to the occupants. The inlets for air supply to the furnaces are facing damp, unwholesome areas, which always contain dirt and litter from the school yard and the street.

Ten story apartment houses, none too secure against fire, are becoming common in this city, one of 14 stories is reported as to be built, and possibly those of twenty stories are in contemplation. A protest against this manner of building was made last week at meeting called by prominent citizens, among them some well-known physicians, at which these high buildings were attacked for depriving the streets of light and air and increasing the danger in case of fire. The physicians present went so far as to say the mortality was doubled in large apartment houses. A committee has been appointed to urge a change in the building laws to prevent the erection of these towers, and to secure the insertion of a clause providing for compensation to owners of adjacent property injured by them.

When a plumbing fixture is removed, or the room in which it stands is put to some new use, so that the fixture is permanently disused, too little care is generally given to making sure that the room is disconnected from the drains. Writing on this point, Mr. Fleeming Jenkin mentions the curious use to which, in such a case, a wash-basin had been put to, and not without danger, for it had been converted into a flower-stand, and, of course, the seal of the trap had dried out, and the basin became a direct connection between the drain and the house. When houses are partially remodeled, this point ought to be specially looked to.

It is very common for the citizens of a town, the water supply of which is provided by a private company, to grumble and to urge the purchase of the works by the town. The Niagara Falls *Gazette* takes the opposite ground, however, with regard to the Suspension Bridge Water Works, and advocates the transfer of the works to a company, stating that they would be better managed if owned and controlled by a company than by the village corporation. The town is bonded now for $70,000, and necessary extensions will require an addition to this debt of $18,000 or $20,000. There is a good deal of truth in the ground taken by the *Gazette*.

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ATLANTIC COAST RESORTS.*

Through the courtesy of the National Board of Health, we are able to present the following abstract from Mr. E. W. Bowditch's report on the sanitary condition of the health resorts on the Atlantic coast.

Atlantic City, N. J., the favorite summer resort for Philadelphians and Baltimoreans, occupies a portion of a long, narrow, flat, sandy island, surrounded on all sides by salt water, and separated from the hard land by seven miles of salt marshes. It is naturally as unattractive a spot as could well be selected, lacking good well water, possessing an extended but not specially pleasing prospect, and with a possible bathing beach perhaps ten miles long, no portion of which seems to be free from dangerous undertow.

This island, three-quarters of a mile wide, and ten miles long, upon which the city is built, is separated from the marshes on the west by a deep creek, navigable for vessels through its entire circuit. The city water supply, introduced during the season of 1882, has been brought across the marshes from the hard land; the artesian wells in the city, sunk to a depth of over eight hundred feet (entirely through fine sand and gravel) failing to obtain water of even reasonably good quality. There are no brooks or other available source of supply on the island proper.

The resident population is not large, six thousand perhaps being an outside figure, but this is swelled in summer to fully fifty thousand, and, at times, runs as high as seventy thousand (for a single day), converting the city into a sort of Coney Island for the inland cities and towns near by.

The floating population, brought down daily by the several railroads, on trains exceeded in length and number only by those that leave Brooklyn and Bay Ridge for the breathing places on the Southern Long Island shore, are accommodated in great wooden pavilions similar to those seen at West Brighton beach, Coney Island.

The cottage element is widely different, and occupies mainly those portions of the city apart from that given up to excursionists. Taken as a whole, however, the effect is very cosmopolitan, and perhaps on that account more interesting than it otherwise would be.

Until this season, the only water used for drinking purposes was from cisterns. Not only cottages, but hotels accommodating hundreds of people, possessed no other supply of potable water. The highest portion of the island being less than twelve feet above the sea, nearly all cesspools and many of the privies are built so that there is standing water in them at all times. It is exceptional to find one otherwise, unless in the highest part of the island; this in itself would render the use of well water unwise.

Houses are obliged, by ordinance, to drain into cesspools, that are called tight, from having impervious sides, and sometimes tops. As the bottoms are, so far as noticed, invariably open, they should more properly be classed as modified leaching cesspools. Many are exceedingly primitive wooden structures, and some of the best hotels depend entirely on sunken boxes or barrels for the disposal of their kitchen sewage. Privy vaults are built in the same manner, and from those that at all times have standing water in them the stench is dreadful whenever the contents are stirred by the addition of further sewage.

In 1881 the sewers that existed were intended for surface water only. That this was wise seems evident, from the outfalls being at the rear of the city on the marshes, where sewage, if delivered, could scarcely be got rid of in any direction.

Of course, where cesspools and privies are provided with open bottoms, the soil pollution must become greater and greater every year, and at Atlantic City owing to the incredulity of people, it has been extremely difficult to apply the proper remedies, many residents still believing that because the level of the ground water rises and falls perceptibly, at times being coincident with the tides, that *therefore* all cesspool matter, other than solids, must work off through the soil, and so on to the sea, thereby entirely disappearing in an appreciably short time.

Such reasoning is fallacious, for when cesspool and vault matters are disposed of by soakage at such a depth below the surface, all proper oxidation is much retarded, if not entirely prevented, and foul matters remain latent indefinitely.

Wells.—Many tubular wells are found, from twelve to eighteen feet deep, in various parts of the city. As might be expected, the water from these, though abundant in quantity, is foul and unfit for use in the houses. For drinking purposes, therefore, cistern water only was permitted (1881), and so desirable is this considered that houses are rarely occupied unless there be a cistern on the premises of satisfactory size, and having a sufficient supply of water in it. There seems to be no regular custom about the use of filters.

Cellars.—Till recently it was by no means universal to have cellars under the houses, because the water is so near the surface of the ground. Latterly, however, houses are provided with apologies for cellars, made by raising the first floors high above the natural level of the ground, and either banking around with earth or building lattice work.

The sanitary condition of the city in the past has justly been a subject of criticism; so much so, that in May, 1880, a local board of health was appointed to attend to the cleanliness of the community. The board, which has proved itself a very stiff new broom, has already accomplished many gratifying reforms, and while only a beginning has yet been made, whatever has been attempted has been carried out fully in detail.

For instance, garbage is regularly and carefully removed in ingeniously constructed wrought iron carts, with little or no annoyance to the public, once in every twenty-four hours from the cottages, and twice during the same period from all public houses. As a result, the health of the city has been appreciably better. The service as now rendered seems, so far as it goes, both satisfactory and efficient, and what has been accomplished has been done in the face of very considerable opposition.

A word should be said about the luxurious and cozy little cottage hotels. So far as chambers, parlors, cooking, etc., are concerned, any one of the dozen or more that are to be found open the year round, will prove as comfortable and pleasant as even an invalid could ask. It is to be hoped that the bath-room and kitchen accommodations will, before many years, be equally good; unless they are, Atlantic City hotels will scarcely rank where they should.

Along the New Jersey shore, but more noticeably south of Atlantic City, are numerous small communities of summer residents, who live in very primitive fashion, lacking the freedom of a camp life, yet without many of the comforts of a civilized one. Houses are set on posts, garbage is piled indiscriminately on the ground outside, and shallow wells and barrel cesspools furnish water and dispose of sewage, respectively. One of these settlements, perhaps better in architecture than the average, is a collection of houses built upon a fresh water marsh, just back of the beach, some miles south of Atlantic City. The buildings are very slightly above marsh level—not more than a few feet, and are built in the manner described above. A more undesirable location and general arrangement it is difficult to imagine. The public privies were intended to be cleanly and of proper pattern, but at the date of visit (May 22, 1881) they were very filthy, and the iron boxes full to overflowing with fæces and rain water. By accident or design the public privies are located to the windward of the houses, and it is stated that a bad smell is frequently noticable from this source. It is not to be understood that this state of things is confined to this one place, or even to the Jersey coast, for similar instances can be found at intervals all along the shore to Mount Desert, and are most numerous, perhaps, at Martha's Vineyard and on Long Island.

To the north of Atlantic City, on the coast, beginning at the northern extremity of Barnegat Bay, is a succession of summer resorts, occupied by thousands of people, many of whom go daily to New York. Point Pleasant, Brielle, Manasquan, Sea Girt, Spring Lake, Ocean Beach, Asbury Park, Deal Beach, Elberon, Long Branch, Monmouth Beach, Low Moor, Seabright and Highlands, join each other, and occupy most of the coast between Point Pleasant and Sandy Hook. Perhaps a description of those most widely known will answer for all, more especially as they furnish at once examples of the best and the poorest on that portion of the coast.

"The Elberon" originally comprised twenty-five cottages and a small hotel, though latterly the fashion has been to extend the limits of the territory covered by the name, until now it is understood to be the court end of Long Branch (summer town), rather than a distinctly separate establishment.

Elberon Hotel, built in 1877, exhibits the first instance of intelligent hotel plumbing and general sanitary arrangement, combined with careful maintenance, met with in New Jersey. Probably many of the details might be somewhat differently arranged, with advantage, but the work is well planned and properly carried out. The outfall of the sewer on the beach might, perhaps, be improved and the cesspools omitted entirely, but in point of maintenance it is second only to the Ocean House at Newport, R. I. There is both well and public water.

Long Branch village (winter town) is not, as many suppose, on the water, but on the contrary, is half a mile inland. The summer town, however, which joins the winter town to the north of Elberon, is back from the cliff only so far as is requisite for an avenue and a narrow park on the water side. At West End, where the avenue turns an abrupt right angle, and just south of the celebrated Iron Pier, is the first of the large hotels, many of which face the avenue, within Long Branch limits. The public water works at Green's Pond, on the northern edge of Elberon, and half a mile south of West End, supply water for Long Branch, Monmouth Beach and Low Moor, the requisite pressure being obtained by a stand pipe. Of sewers it may be said there are none from Elberon to Sandy Hook, though there are one or two exceptions—notably the Elberon Hotel referred to, where the overflow from cesspool runs to the sea, and the Ocean Hotel, Long Branch, where a pipe is carried out under the Iron Pier, a distance of 900 feet. Fortunately, the soil is for the most part sandy over the entire distance between Deal Beach and Sandy Hook, so that the public water can be leached away through cesspools for a long period without serious trouble. At the large hotels, accommodating from 1,000 to 1,600 guests, one would expect to find the cesspools most troublesome, more particularly, perhaps, in connection with those public houses whose lawns and yards are contracted in size. This supposition is entirely borne out by facts. Some of the back yards are literally honeycombed with cesspools that, one after another, becoming clogged with grease and other filth, have been discontinued. To such an extent is grease troublesome, that at one hotel, where the distance between scullery sinks and cesspool is longer than usual, and less fall to the drain, the whole line of pipe is taken out and replaced once every season, being entirely choked with grease. Occasionally it is necessary to go through this operation twice.

But one hotel, so far as known, makes any effort to separate the grease from the waste water, but imperfect as the process is, it has prevented some two tons of grease from passing through the pipes, each season since the experiment was first tried.

At the Ocean Hotel is, perhaps, the best instance of a large and properly maintained earth-closet privy that has been seen anywhere. Twenty-eight closets (on two floors) empty into a brick vault. Earth (salt sand) is sprinkled three times daily upon the deposits, and the vault is free from offensive smells.

A portion of the sewage of the Ocean Hotel is carried through a six-inch wrought-iron pipe into deep water under the Iron Pier, delivery being into a sheet-iron tank having a perforated cover. This was carefully and thoroughly done, but the sewage from 1,000 people delivered at one point, only nine hundred feet from the bathing beach, is sometimes disagreeably noticed at the latter place. The other hotels, so far as visited, were all inferior, both in construction and maintenance, so far as their sanitary arrangements were concerned. It should be mentioned that the water closet tower of the West End, which is separated from the hotel proper, is kept sweet and clean, and must add very much to the comfort of the hotel. The maintenance throughout the hotel appeared to be excellent, but the principle of so large a building depending wholly on cesspools is wrong and should be superseded as soon as possible by sewerage.

Before leaving Long Branch hotels it may be well to call attention to an arrangement which, in a more or less modified form, is not unfrequently met with, but that in any form seems undesirable, and scarcely as cleanly as might be.

Swill Rooms appear to be a New Jersey invention. They are at times under a portion of the carving room and kitchen, or, what is unusual, on the same level. When located underneath, the garbage is dumped into a hopper and falls directly into the room, or vault, or sometimes into a cart that may be there for the purpose. When on the same level a wheelbarrow or buckets are made use of. Frequently the vaults are of brick, lacking adequate

*Report of E. W. Bowditch, C. E., to the National Board of Health.

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ventilation, and kept in permissible order only by repeated applications of chloride of lime. Instances are noted where refrigerator wastes drip untrapped into the swill room.

In warm weather, few things are more disgusting or nauseating than sour, partially decomposed garbage, and the principle should always be to carry it off the premises as soon as possible, as is done at Atlantic City.

At Monmouth Beach there is but one public house and that one is used largely by cottagers in the neighborhood who go there for meals. From this point to Sandy Hook the land between the Ocean on one side and Shrewsbury River on the other is quite low, much of it marshy, and in places so narrow as to afford room for but a single row of lots on either side of the avenue, In fact, most of the houses are on the Ocean side only, and the stables on the other. The difficulties attending proper drainage are here shown in an aggravated condition, and the black, stagnant sewage near the railroad at Monmouth is suggestive of trouble in the near future, the beginning of which, perhaps, occurred in 1882 at a summer hotel in Seabright. The cottages on Monmouth, Low Moor and Seabright beaches, are all of the better class, except the remains of the fishing village and life-saving station at the latter place. At Seabright, opposite Navesink Highlands, the land is so low that it is difficult to obtain sufficient fall to run the sewage anywhere except into Shrewsbury River, and though this is done occasionally the remedy will be apt to prove more serious than the disease. The public water, furnished from Green's Pond, was not pleasant to the taste during the season of 1881, though the analysis made of it December 15, 1881, showed it to be "an excellent surface (river or pond) water." At times, during the summer, strings of green slime were occasionally drawn from the pipes, and the water proved cathartic in quality. This may have been due to a variety of causes, though the source of supply is not altogether what could be desired. A very considerable sum of money has been expended on the water works since that date, and much more will, undoubtedly, have to be spent before it is entirely satisfactory. It is particularly important that Monmouth and Seabright should be furnished with a plentiful supply of the best public water, as the low character of the land and the use of leaching cesspools renders well water as doubtful a benefit as at Atlantic City.

While recognizing the fact that it is far easier to criticize than to suggest adequate remedies, yet it is certain that before many years the whole coast from Navesink Highlands to Deal Beach (21 miles) must be sewered on some comprehensive plan, or there will be trouble.

That a satisfactory system can be designed does not admit of a doubt, though the least expensive arrangement for effectually disposing of the sewerage of so large a district will require some little study, and, more than anything else, an intelligent coöperation on the part of various towns interested.

[TO BE CONTINUED.]

STEAM FITTING AND STEAM HEATING.

BY "THERMUS."

No. XVIII.

(Continued from page 147.)

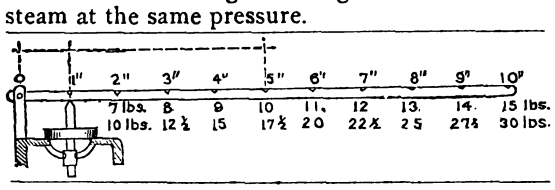
SAFETY VALVES.

The first part of this article was simply a resumé of prevalent ideas or of common practice in power boilers, and was given for the purpose of impressing on the steam fitter the fact that a hole in a boiler of a given size will let out a greater weight of steam at high pressures than at low ones, and that, consequently, a greater opening of the safety valve is required for a low pressure heating apparatus to relieve or remove the steam made, and not allow the pressure to increase above the low pressure maximum, than would be necessary for a high pressure one, the amount of water converted to steam being the same in both cases.

The above will apply to all apertures in boilers, whether safety valves of a constant and invariable opening (patent valves which give a full opening at once), or to pipes of fixed sizes; but probably does not apply to common valves (assuming that they are sufficiently large for the high pressure), as the common valve has a variable lift—being greater for *low pressures*—the increase of lift or opening for low pressures being presumed to be in as great a ratio (at least for a 4-inch disk) as the decreased velocity and density of the steam. Thus, the conclusions the steam fitter should draw and fix in his mind are: 1st. That with a safety valve that will give a fixed opening of the full size of the disk at all pressures—by some extraneous or differential principle—a very much smaller valve (nominally) will do, and that it must be proportioned for the greatest evaporation at the lowest pressure. 2d. That if common valves are used, the disk or nominal size must be of large proportions, beyond all doubt, so that no matter how little the lift may be, the annular opening around the edge of the disk will be sufficient for the greatest amount of evaporation (by weight) at the highest pressure.

The practical question to the fitter now is, what size opening (area of aperture) will do for steam at the different pressures?

To arrive at any intelligent conception of what the aperture should be, it is necessary to know the velocity of flow of steam into the atmosphere (at the required pressure) per second of time and the weight of a given bulk of the steam at the same pressure.



About the weight of steam, there is not much question, but for the velocity of steam at high pressures there is a difference of opinion, so much so, that at 100 pounds pressure above atmosphere the minimum velocity, flowing into the air, through the most favorable shaped aperture, may be taken at about 1,900 feet per second, while one authority puts it as high as 2,750 feet; while at 10 pounds above atmosphere the greatest variation in formula will confine the difference to 200 feet, the minimum being about 1,200 per second. In this problem, and in all others wherein there are doubtful factors, the benefit of the doubt should be given to the side of safety, and in this case, the slower we assume the velocity for steam the larger will be our opening or safety valve. But another question here interposes, namely: Will 1,200 feet per second at 10 pounds pressure and 1,900 feet at 100 pounds pressure do for all shaped openings? Certainly not. A round hole, one square inch in area, will admit more steam to pass in the same time than an opening of $\frac{2}{16}$ of an inch all around a 4-inch disk, but what the loss will be for the latter shape, or for any other shape is again an unknown quantity, which *may reach one quarter* (?) for ordinary valves and turns in escape pipes. Thus, to be on the side of safety, it is better to reduce the 1,200 feet to 900 feet and the 1,900 feet to 1,425 feet (for the respective pressures mentioned), to provide for the contingencies of ordinary practice and modes of connecting.

With regard to the *relative volume of steam* any of the tables given are sufficiently correct for this purpose, and 1060 and 260, respectively, for 10 and 100 pound pressure above atmosphere will do.*

Then if we have, say, one cubic foot of water converted to steam at 10 pounds pressure and occupying a space of 1060 cubic feet, what will be the area of the hole in square inches, that will allow it to pass in one hour, the velocity being 900 feet per second?

Perhaps the simplest rule to do this by, so as to give a lasting impression to the ordinary reader, is to have him imagine or calculate what length 1060 cubic feet will make if it is stretched out to one square inch in section, and calculated. Thus—1,060 cubic feet x 144 = 152,640 feet in length, divided by 3,600 seconds = 42.75 lineal feet per second, divided by 900 feet per second = .0475: the fraction of a square inch for each cubic foot of water evaporated in an hour; = 2.37 square inches for a 50-horse power boiler; being very nearly the size of an 1½ pipe.

Again for the higher pressure (100 pounds) 260 x 144 = 37,440 ÷ 3,600 = 10.4 ÷ 1,425 = .00733; the fraction of the square inch for each cubic foot of water evaporated in an hour = .3665 of a square inch for a 50-horse power boiler.

Another point of interest to fitting is an easy method of finding the *weight* necessary for a safety valve.

If they reason this way they will always be able to find the required weight within practical limits and approximately correct. If the area of the valve disk is one square inch, it is only necessary to have a one pound weight placed on the top of it (assuming itself to have no weight) to keep it closed against one pound per square inch of steam, and of course if the weight is 10 pounds, it will hold the disk against 10 pounds per square inch. This is substantially the "low pressure safety valve" with the weight on a spindle on the back of the disk; the weight of the disk and the "weight" having a total effect (without leverage) of the square inches of the valve multiplied by the maximum pressure to be carried. But with valves with levers for high-pressures wherein the weight must be fixed and kept within ordinary limits of size, the relative position of the weight to the disk must be considered and the weight of the lever also.

The lever always represents a constant resistance to the valve and should be found first. For instance, with a disk of one square inch, with a lever of *one* pound, the lever being ten inches long as shown, and the distance from the valve spindle to the fulcrum one inch, the lever will always exert the same pressure on the disk as a *one pound weight* would, placed on the lever at half its length (five inches). Thus it may be borne in mind that the lever is a weight hung on an imaginary lever of half its own length and exerting power according to its weight.

In this case where the lever is one pound, and the distance from the fulcrum to the spindle one inch, and the whole length ten inches, the lever will exert five pounds on the valve *without a weight*. But it is necessary to have a weight which is movable, and suppose we have one, of just *one pound* also. If we placed this weight, now, on top of the spindle it adds just one pound to the force exerted by the lever (5 + 1 = 6) making the total power at that point six pounds; but if we move it the same distance from the spindle that the fulcrum is, only in the opposite direction (out on the lever), it will exert two pounds additional to the power exerted by the lever, and will exert an additional pound per inch as it is moved from the disk, giving for the end of the lever 15 pounds and for the first notch seven.

If instead of a one pound ball or weight we can get only a 2½ pound ball, the power exerted by it will be, the weight 2½ pounds by first notch (2 inches) = 5 lbs. + 5 lb. for lever = 10 lbs., or by last notch, 2½ x 10 = 25 + 5 = 30 lbs.

*For those not sufficiently versed in the terms applied to steam it is well to explain that the 1060 and 260 are the times a given bulk of water is increased by being converted to steam at these pressures.

Our correspondents have sent to us several instances of the damage which rats may do to lead pipes, and have pointed out the risk of escape of sewer gas from this cause where this metal is used for soil pipes. An interesting incident in this connection has been reported by London *Builder*, from Berlin. A wet spot in a wall, near where a water pipe ascended, led to examination, and on opening the wall a number of dead rats were found in the recess made for the pipe, which had been knawed clean through. It is supposed the rats had been drowned by the escaping water.

One hundred and ninety-six thousand, eight hundred and ninety-three inspections were made and 15,325 complaints received during 1882 by the Board of Health of this city.

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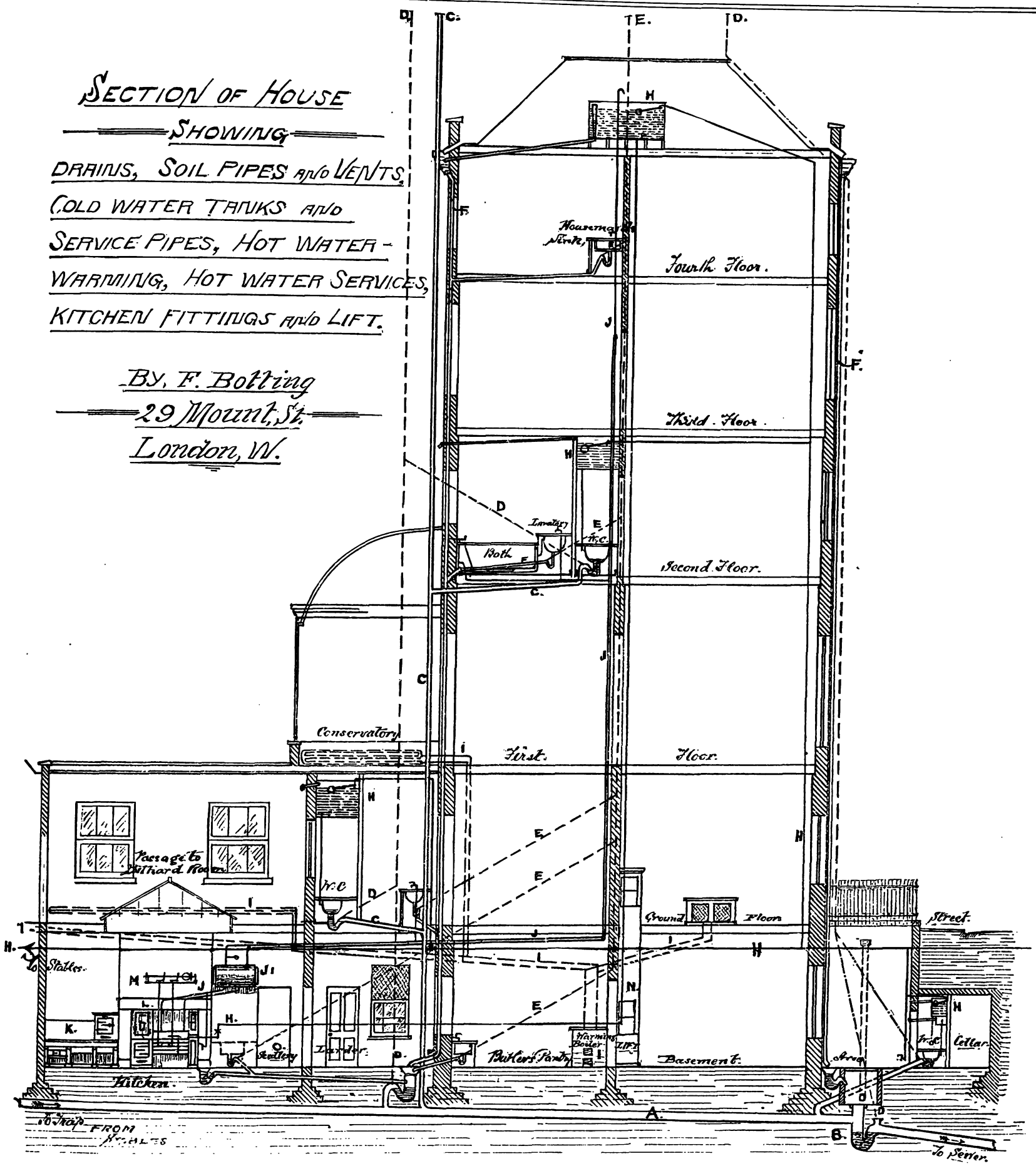

SECTION OF A LONDON RESIDENCE SHOWING THE PLUMBING.

A LONDON RESIDENCE.

For the above sketch, which shows the method of plumbing of a London residence of the better class, we are indebted to Mr. Francis Botting.

Our American readers will notice several features that are different from the practice in this country. Notably, the water closets discharge into a pipe that receives no other drainage. The other fixtures drain into pipes that discharge over open-mouthed traps.

The arrangement of the main trap, fresh air inlet and communicating chamber, is good, though we do not like the house drain buried under basement floor, as seems to be necessary in a house planned like the one shown.

TREES IN TOWNS

A correspondence has been recently carried on in the local press at Geneva as to the value, or otherwise, of trees in streets and open spaces. Dr. Piachaud contended that trees in streets do more harm than good, that they impede the circulation of the air, and that, as for the shade they afford, people who do not like sunshine have only to keep on the shady side of the street. Instead of planting more trees, as some propose, he would rather, in the interests of hygiene, remove all existing trees. Professor Goret, of the University, who, though an eminent physicist and chemist, disclaims any special knowledge of medicine of hygiene, has replied. He treats the matter from a common-sense and scientific point of view. He says that trees in streets temper the heat and serve as a protection from dust, and that the evaporation from their leaves tends to keep the surrounding air cool and moist; that the perpetual vibration of their foliage and swaying of their branches, whilst admitting a sufficient amount of light, serve to protect the eyes from the noonday glare. Professor Goret's last argument is that the roots of trees draw up stagnant waters and absorb the organic matters contained in the filth from which the streets of a town are never free, and which, after infiltrating the ground, are a frequent cause of fevers and infection. Trees, in fact, have the same effect on the subsoil of towns as fields have on the contents of their sewers—they act as disinfectants. Taking these facts into consideration, the Professor strongly recommends the planting of trees, at proper intervals, in streets and squares. He also condemns the practice that prevails in many continental towns of cutting the trees down to a uniform size, as the branches of trees so treated become so impacted as to be impervious to light, and the shade they give under such circumstances, although deep, is too circumscribed to be of much use.—*Lancet.*

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Feb. 17.....	24.95	18.32	21.49	27.61	29.15	19.15

E. G. LOVE, Ph.D., *Gas Examiner.*

THE HISTORY AND PROGRESS OP GAS-LIGHTING.

Mr. Arthur H. Elliott delivered a lecture upon the above subject before the Chemical Society of the School of Mines, Columbia College on Friday evening Feb. 16.

The lecturer began by reviewing the condition of public and private methods of illumination before and up to about one hundred years ago. Speaking of candles he described the various devices for obtaining a better light by burning them in an inclined position and by using compound wicks of cotton yarn and wire twisted together. By inclining the candle at an angle of about thirty degrees, the black snuff was consumed by coming into contact with the air, the carbonaceous material projecting out at the side of the flame. With the cotton and wire twist, as the candle burned the wire untwisted and spread the snuff around outside the candle flame, allowing it to be better consumed.

For outside illumination lamps and torches carried by individual travellers were first used. Afterwards an organized brigade of torch boys was introduced into the larger cities. But it was not till the sixteenth century that any systematic lighting of the public thoroughfares was inaugurated and when Paris was first lighted with lamps, containing tallow candles, the event was a notable one. This lighting was instituted by a Lieutenant of Police in Paris, as a means of public safety, and it cast such a new aspect over the city, that a medal was struck to commemorate the event. A system of this character was in use in London, in 1800. The oil lamps used for lighting these lamps were said to be equal to half that of a tallow dip.

In Paris, in the year 1821, there were 13,360 public lamps of oil and tallow. And as late as 1844 there were over 3,000 such lamps.

The idea of using coal gas as a means of illumination is due to a Scotchman named William Murdoch. He experimented at Redruth in the county of Cornwall. He made gas from different kinds of coal, lighted his house and offices with it, and even collected some and carried it to light a locomotive upon which he travelled between the mines of which he was manager.

In 1798 he entered the service of Boulton and Watt, the engineers at Soho, near Birmingham. Here he made further experiments, and in 1802 made a public exhibition of gas by illuminating the works in honor of the peace of Amiens.

In 1805, Murdoch lighted a large cotton mill at Salford, Manchester, replacing twenty-five hundred candles with gas jets, at a cost of $3,000 per year, against $10,000 formerly paid for the candles.

While Murdoch was at Soho, a young man named Samuel Clegg, was apprenticed to Boulton and Watt, to learn engineering; but when he met Murdoch his attention was directed to gas lighting rather than engine building.

In 1805 he left Soho and built a gas works to light the largest cotton mill in the British Isles, at Sowerby Bridge, near Halifax. But neither Murdoch nor Clegg had any idea of the possibilities of gas lighting.

In 1803, a man named Winsor appeared in London, who was the first individual to realize the scope of gas lighting. He instituted lectures upon coal gas at the Lyceum Theatre in London; and being unlearned in the English language, he hired men to do the talking while he made the experiments. At these exhibitions he carried the gas in flexible tubes, showed the brilliancy of the light, the freedom from sparks, that the flames could be placed in any position, and that gas jets could not be so easily blown out as the flames of oil lamps.

In 1807 Winsor set up a number of gas lights in Pall Mall, London, this being the first time gas was used as a street light in history,

Winsor ultimately obtained a charter for a gas company from the English Parliament.

During the discussion of the Bill in the House of Commons, William Wilberforce branded the scheme as a bubble imposed on public credulity. Sir Humphrey Davy asked with a sneer if it was proposed to use the Dome of St. Paul's for a gas holder. The butchers opposed the new gas scheme, because the price of tallow would fall and they would have to charge more for the lean meat. The ship builders were aroused. Hull had built two thousand ships for the whale trade and made directly and indirectly thirty-five millions of dollars by it. London, Peterhead and Liverpool had almost as valuable interests at stake.

While Winsor was working up his gas company in London, Murdoch and Clegg were improving the apparatus to manufacture coal gas. They erected a number of sets of gas lighting plant in various places; each apparatus being an improvement on its predecessor.

About this time Heard, the former assistant of Winsor, used both lime and oxide of iron to take the sulphur out coal gas. And Clegg used milk of lime in the tank of the gasholder at Sowerby Bridge.

In 1812 Clegg lighted the large book and print store of Mr. Ackermann, in the Strand, London. The affair was such a success that in the following year, when only thirty-two years old, he was made sole manager of the various works of the Chartered Gas Company and saved them from failure.

In 1813 Westminster Bridge was lighted by gas, and the next year St. Margaret's parish. From this time forward gaslighting was a series of the most brilliant successes.

At first pipes of lead were used, and patents were issued for those made of wood and paper, but finally ordinary wrought iron pipe was found to be the most convenient.

In Paris, in 1802, Le Bon made gas from wood and lighted his house with it. In 1819 the first street light from gas was on the Faubourg St. Denis. But Frenchmen were slow in adopting gas. In 1829 there were only forty gas lights in the streets of Paris; and as late as 1844 there were over three thousand oil lanterns to nearly seven thousand gas lights.

In Germany, Lampadius and Pruhtl followed the English plan of isolated systems of lighting. These were used in 1811 in Freiburg and in Vienna. But Sir William Congreve, an Englishman, was the first to make public lighting a success in Germany in the year 1825. And the city of Hanover was the first to open its streets to the enterprise. Dresden adopted it in 1829, Vienna in 1833, and other cities very rapidly after this date.

In America gas was made and used as early as 1813, by David Melville, at the Bath House, Newport.

In 1821 Baltimore made an attempt to introduce gas. Boston succeeded in 1822, and the following year New York came to the front by organizing the New York Gas Light Company. The first house lighted by gas was on Cherry street, and was the residence of Mr. Samuel Leggett, the first president of the new gas company.

Speaking of the progress of gas lighting, the lecturer remarked that in New York city six companies can supply about thirty millions of cubic feet of gas per day, about three-fifths of which is coal gas, the rest being wood or water gas.

The streets of New York are lighted with about twenty-five thousand gas lamps, which are supplied through about nine hundred miles of mains, and use three hundred millions of cubic feet of gas per year.

At the close of the lecture a number of pictures were exhibited with the magic lantern, illustrating the various stages of the ordinary coal gas process, and also those of the water gas process. The latter pictures were photographs of interiors of the Works of the Municipal Gas Light Company, which had been lent by Mr. W. H. Bradley for the purpose of illustrating the lecture.

ELECTRIC LIGHT NOTES.

The Light-House Board, on the 12th inst., approved the project for establishing an electric light on Dry Romer, New York Bay.

The telegraph committee of Philadelphia councils has reported favorably an ordinance granting permission to the Metropolitan Underground Telegraph, Telephone and Electric Light Company to lay wires in certain streets.

The English Board has resigned from the Faure Electric Accumulator Company and the concern has gone over wholly to the direction of Mr. Philipport. This is the company which we recently referred to as having stopped making accumulators and gone into the business of selling "rights."

A bogus statement has been going through the press that the Board of Aldermen of Boston had passed an order prohibiting the lighting of the city by electricity. The report is denied by Superintendent of Lamps George H. Allen, and the fact is that the Aldermen ordered the entire city to be lighted with electricity.

Mr. Enos Barton, President of the Western Electric Company, has been interviewed by the Chicago *Times* on the subject of underground electric wires. The only underground wire in Chicago at present is that of the Western Indiana Company, which has been used for six months and has given satisfaction. A single tube contains 20 wires, and the cost of the system is about $3,000 per mile. Mr. Barton considered the system entirely practicable, and thought that a new company would find it cheaper at the end of ten years to put its wires underground; for a company with an existing overhead system the change would entail a large expense.

The electric light tower over Central Market House, Cleveland, fell down on the 9th inst., when a height of 200 feet had been reached. The Cleveland *Leader* says the structure was to be built entirely of gas pipe, and was triangular in shape. The work was begun several weeks since under the supervision of a man sent there by the Elgin Company. He had never before superintended such a job, but the Elgin Company being crowded with orders thought they could trust the work in his hands. When several sections of the tower had been erected, however, it became apparent to the Brush Company that the superintendent did not understand his business. He was, therefore, succeeded by Superintendent Cunningham, from Elgin. The poor work was not taken down, however, and in consequence the structure fell.

Meter-ites.

An explosion of gasoline works took place the 9th inst. in a restaurant in Norfolk, Va., which wrecked the building and injured six persons.

The Chief Engineer of the Philadelphia Gas Works reports that 3,337,490 gallons of tar were furnished to the contractors from the works in 1882.

The State Department of Pennsylvania has granted a charter to the Citizens' Gas Light, Heat and Power Company, of Chester. The Company has a capital of $100,000.

A vein of natural gas was struck the 13th inst., at Hills Station, near Pittsburgh, Pa., at a depth of 1,170 feet; and igniting it set fire to the derrick and shanty. It is intended to use it at the Glass Plate Manufactory at Hills Station.

The Bureau of Statistics of the Treasury Department reports that in December, 1882, the export of petroleum and petroleum products was 30,201,639 gallons valued at $2,952,914. The total export for the year amounted to 503,492,642 gallons, valued at $44,623,074, against 514,561,719 gallons, valued at $48,556,103 in 1881.

It is reported from Batavia, N. Y., that a man and wife retired on a Saturday night in a room adjoining one in which was a coal stove. The escape of gas rendered them both insensible, and they remained unconscious until Monday morning, and not until late in the day did they discover it was Monday, not Sunday. Such is the story.

The report of Mr Luce, the Michigan State Oil Inspector, shows that during 1882 there were 133,678 barrels of oil inspected, at a total cost of $16,682.61 the receipts in excess of expenses being $4,702.72. The price of inspection was reduced to 15 cents a barrel in 1881, and he now recommends a reduction of the inspection fee to 13 cents per barrel.

The flood at Cincinnati effected a temporary transformation in the mode of lighting. Sunday evening the 11th inst, the gas failed, and resort was had to oil, candles and the electric light. The Brush Company put lamps into several hotels and theatres, including the Grand Opera House, and the sale of candles and oil lamps reached such a point as to raise prices to scarcity rates. The streets, except the few that had electric lamps, were dark and deserted.

A short time ago a company known as the Water Gas Company of New Orleans purchased from the United Gas Improvement Company of Philadelphia the right to use the latter's patents in the State of Louisiana, and obtained from the New Orleans Council the right to manufacture and sell their gas in that city. They bought a site for works and were going ahead when the old New Orleans Gaslight Company applied to the courts to restrain them. Negotiations followed, which have resulted in the United Gas Improvement Company buying back from the Water Company their patent rights for New Orleans and reselling the same to the old company, which will now alter their works to manufacture the water gas.

A FORTUNE FROM A WELL.

Mr. Henry L. Goodwin, of East Hartford, Conn., made a good share of his fortune by a curious sort of monopoly. He was a California "Forty-niner," and in those early days, when San Francisco and its vicinity had a wretched poor supply of drinking water, he was one evening charged half a dollar by a man who owned a well for a drink for his oxen. That made him mad, and he resolved that he too would become known as a Man-Who-Owns-a-Well. With the aid of his partner, an engineer, he bored eighty feet deep on his town lot, and there struck an inexhaustible supply of the best water yet found on the whole coast. Then he established a free drinking fountain for all passers-by, but for all other purposes he sold six gallons for a cent. Cattle owners could have their stock watered for 50 cents a yoke per week. For a long time every one who wanted pure water had to go to Goodwin's well for it, and a handsome fortune was realized therefrom.—*Tribune.*

The Slaughter House Reform Society of London, have raised £1,300 to establish a small model *abattoir.* The object of the society is to teach the most rapid, skilled and humane methods of slaughtering, to advocate *abattoirs,* to insist on the necessity of cleanliness, and to bring into use the completest means of removing the offal, blood, and other substances, and to promote thorough inspection.

A large number of water meters have been frozen in Rochester, N. Y., during the recent cold weather, in consequence of neglect of the rules of the water board concerning protection against frost. The Board have notified consumers, on whose premises meters are placed, that they must keep them protected or pay the damages.

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THE HOT WATER SUPPLY OF A SMALL HOTEL.

To the Editor of THE SANITARY ENGINEER:

I wish to supply hot water to some fifty wash basins in a small hotel, and seven baths. The hotel has a main building with two wings, enclosing a sort of court, as shown on the plan, Fig. 1, and there are rooms with wash basins on each side of halls running entirely around. I shall have wash basins and baths on two floors. Shall use a coil in a laundry stove to heat my water. Now, I want to know what size of pipe I had better use. Lead will be the material. The pipe will be laid on boards under the floors to give a good grade. I also want to know in which way I had better run my pipe. You will see I am obliged to take the pipe around each floor, because I cannot cross over on account of the court. Had I better first rise with the hot water pipe to second floor, direct from boiler, then run around that floor, drop to first floor, and run around that, then drop to boiler, as in Fig. 2? or had I better rise to first floor, then run around that, then rise to second floor, and run around that, and return to boiler thus, Fig. 3?

I should prefer the first, because I think I can get rid of the air easier with that arrangement, by taking an expansion pipe over the tank from the point *A*, giving pipes on second floor a slight pitch toward *B*, and on the first floor toward *C* in this plan, Fig. 2. It is also my opinion that I should get a more rapid circulation with this arrangement, because I believe there will be more difference of temperature between the flow and return than with the arrange- shown in Fig. 3, and I am anxious to have hot water at the farthest basin in either case. Will you please answer my questions and suggest any improvements which will likely give the hottest water at the last basin?

CONVERSE.

[It is much better to take the hot water from the boiler to the upper story direct, and let the return come from nearest basin back to coil. This is the plan shown in Fig. 2. If the heating coil is at one end of either wing, let the connections between the floors be by a pipe coming down at the end of the other wing. By this means is secured a continuous circulation. Better in some ways would be a riser in the centre of the main building, branching both ways for the wings. The connections between the floors would then be downwards at the ends of both wings, and the circulation would be completed by the return pipes coming together into a main return at the side of the riser. By this means each circulation would only be half as long, and pipe of smaller diameter would be called for. By carrying up the direct pipe to the second floor, not only will Converse get rid more easily of his air and vapor, but he avoids the great difficulty of the plan in Fig. 3. In this latter plan an occupant of a lower room would cut off the supply of hot water to those above him by opening his faucet, when the pressure was small from the water-works or tank. In Fig. 2 there will always be a head upon the lower basins even when the upper ones are in use. With regard to the size of pipe which should be used, it would be best practice to choose one large enough to insure free circulation and a considerable volume of water in the pipe at any one time. Since it is not likely that a very large number of the fifty wash basins or all the baths will be in use at one time, probably 1½-inch pipe could be made to answer, though two-inch would be better.

An experienced plumber of this city recommends that galvanized iron pipe and not lead should be used, as lead will be liable to breakage at joints of branches owing to unequal expansion.]

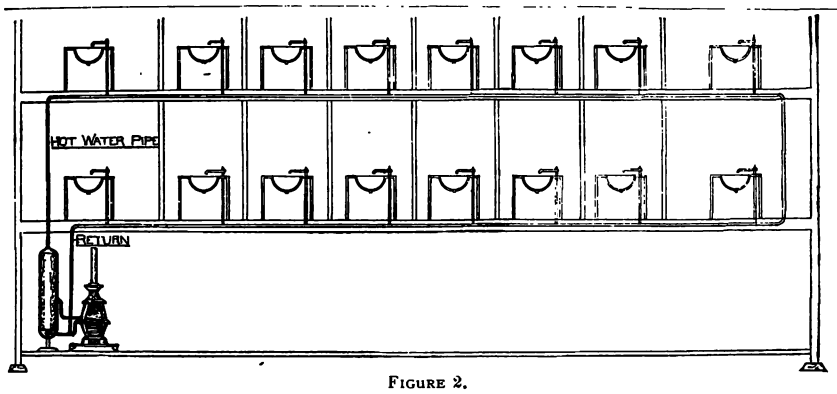

FIGURE 2.

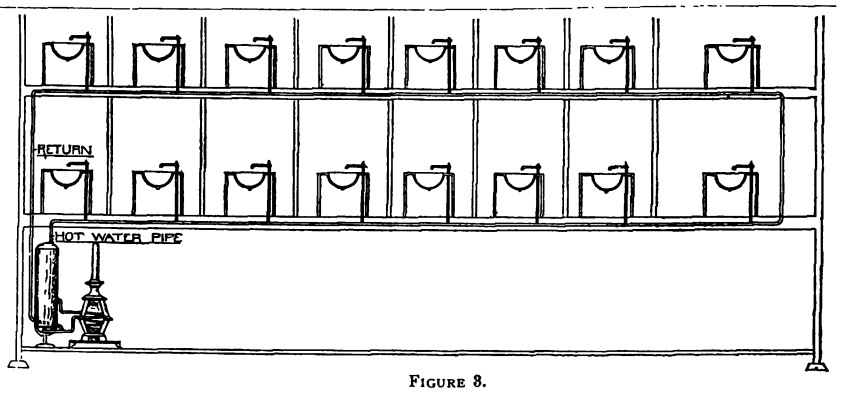

FIGURE 3.

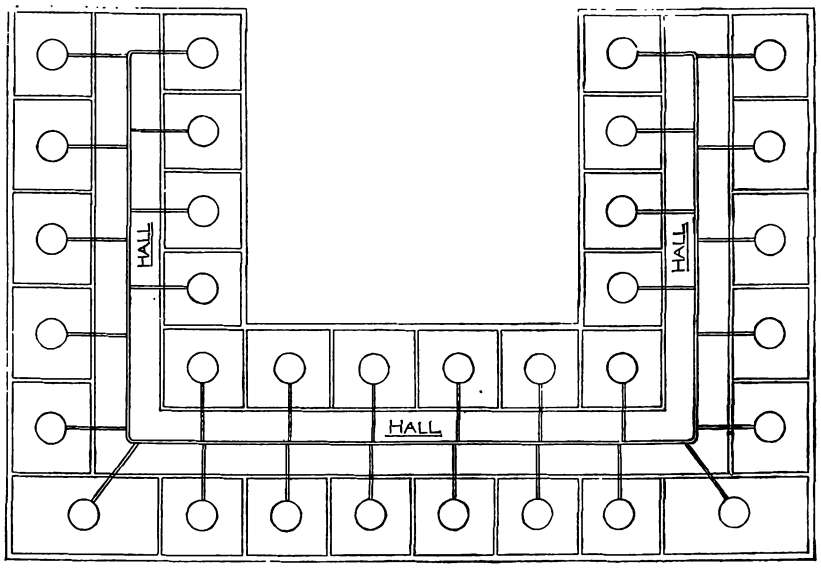

FIGURE 1.

GRADING VENT PIPES.

To the Editor of THE SANITARY ENGINEER:

Will you please advise me what means plumbers in your city take to prevent condensation filling vent pipes and making them no good? It is not always possible to give them a steady pitch.

[They are so arranged that there are no pockets or traps in them, and so that the water of condensation can flow back to the waste pipe in some way. It sometimes requires considerable ingenuity to accomplish this, but that should be exercised every day in the plumbing business.]

THE WARMING AND VENTILATION OF THE ROYAL COURTS OF JUSTICE.

The warming and ventilation of the new Courts of Justice was a subject to which the architect, the late Mr. Street, gave much thought, and it was not until several plans had been elaborated and rejected, that the existing arrangements were decided on. The scheme adopted divides the plan of the building into four nearly equal parts, by lines running at right angles through the centre of the great hall. To each of these is fitted a separate apparatus, the four being alike in power and construction; they are capable of working separately or together, and are arranged so as to be able to work into each other's systems. The medium employed is hot water on the low pressure principle, circulating through pipes formed into ranges and clusters, and measuring in all a little more than eleven miles in length, the water is heated in four 50 horse-power boilers, situated in the crypt under the four angles of the great hall. There are two other boilers of the same dimensions for the generation of steam to be employed for the engines used for propelling air into the courts, and for heating the coils of pipe in the ventilating shafts. The scheme will thus be seen to have been arranged broadly into four divisions, all of which have been again divided into sections of high and low levels. Each section and division is connected, not with the boilers directly, but with arterial mains, which are carried round the crypt, linking the four boilers together. While the general building has been thus provided for, special attention has been bestowed upon the warming and ventilating of the courts themselves, each court being treated separately both as regards its heating and air propelling power. Below each there is a chamber divided into two equal compartments; in one the requisite power is provided to warm and maintain the courts to a temperature of from 58° to 60° in the coldest season with an interchange of air, equal, if necessary, to 10,000 cubic feet per minute. The other compartment is used for cold air. These two chambers merge into one and are covered with a coarse cloth, which is used for mixing and filtering the air before it passes into the court through numerous vertical openings provided behind the wall linings and at at other convenient points. The entrance to these two compartments is under control from the lobbies of each court, so that the air driven in by the fans can be passed through one or the other or partly through both, and can be tempered and mixed to suit every condition of the atmosphere. The supply of air, which in summer is calculated to reach nine and a quarter millions of cubic feet per hour, is drawn from the whole of the areas surrounding the great hall, and is freed from dust and smut by being passed through a fine water spray. The withdrawal of the vitiated atmosphere is accomplished by means of powerful steam coils placed in the ventilating shafts to which access is given by numerous openings in the ceilings and gallaries. Thus far the arrangements we have described have been for the purpose of warming the building. It was felt, however, that it would be necessary to cool the air in hot weather, as well as to circulate it, and for this purpose an ether refrigerating machine has been erected in the crypt consisting of a pair of engines, vapor pumps, refrigerators, and condenser. This machine is of sufficient power to reduce 1,000 gallons of water per hour from 70° to 40° Fahr. The water thus reduced can be converted to fine spray by an "atomizer," and the air passed through it. The cold water that is not absorbed is collected in a cistern and conveyed to the condenser, where it is used to abstract the heat given off by the ether in liquifying, and is finally allowed to escape at a temperature of 90°. A recording thermometer is attached to the inlet and outlet pipes of the cooler, so that the temperature of the service water to the sprays can be adjusted to a nicety.—*The Engineer.*

MASTER PLUMBERS' ELECTION.

The Master Plumbers' Association of this city have elected the following officers for the coming year: President, Col. George D. Scott; First Vice-President, Joseph A. Macdonald; Second Vice-President, N. G. Geraty; Third Vice-President, A. L. Whitelaw; Fourth Vice-President, E. Murphy; Fifth Vice-President, W. Young; Recording Secretary, A. Mead; Financial Secretary, George Mead; Corresponding Secretary, E. B. Cunningham; Treasurer, Alfred Ivers; Sergeant-at-Arms, John Mitchell.

Just previous to the election, Sir Isaac Walpole said that certain members of the club seemed to regard every conflagration as a matter of Providence. He believed in Providence as firmly as the next man, but he didn't run the pipe of his cook stove out of the back window, nor plug up holes in the stove with a pine stick.—*Proceedings of the Lime Kiln Club.*

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Food and Drugs.

THE ANALYSIS OF QUININE PILLS.

To the Editor of THE SANITARY ENGINEER:

In your issue of December last you merely mentioned the fact that the Philadelphia *Medical News* had employed an "expert analyst" to examine the various brands of coated quinine pills, and that five out of seven of the samples had been found not to contain the proper amount of sulphate of quinine.

As THE SANITARY ENGINEER aims to do the fair thing, and as it is one of the very few journals, having a scientific reputation, which paid any serious attention to the statements published by the *Medical News*, I beg to be accorded a hearing.

I can positively state from my own knowledge that the quantitative results obtained by the Philadelphia analyst are about $\frac{8}{100}$ grain short of the truth in the case of two of the more prominent brands mentioned in the report. I have frequently examined the pills made by these two houses, and know whereof I affirm. I believe that this error of $\frac{8}{100}$ grain is tolerably constant, and is due to the very inaccurate method of assay which was employed. The use of excess of ammonia, and shaking the alkaline aqueous mixture with ether are two things which cannot fail to render the results short of the truth. This matter was carefully explained in a subsequent edition of the *Medical News*, and need not be repeated here.

The object of the present paper is to present a method for the separation of quinine from coated pills which has given me remarkably accurate results. I have used it for some months, and would have published it sooner were it not that I have been making careful trials with pills of exactly known composition in order to determine accurately the "limit of error" which might reasonably be expected.

The process which I have used may be termed a "dry process," to distinguish it from the "shaking out" methods most commonly recommended. The latter are valuable where the mixture examined is not too complex, and even in experienced hands, may give very close results in some complex mixtures, but in the case of quinine pills they have not afforded me as accurate results as are to be wished. It seems desirable, therefore, that some method corresponding to the lime-assay methods for cinchona barks should be developed.

Take a sufficient number of pills to represent twenty or forty grains of sulphate of quinine. The smaller number of grains is sufficient if manipulations are made with care and the balance is sensitive to tenths-milligrammes.

Treat the pills in a very small Wedgewood mortar with five cubic centimetres of cold distilled water, until the coating dissolves and the pill mass may be ground under the pestle to a smooth, uniform paste. To this paste add two grammes of freshly slaked lime (calcium hydrate) in powder. Mix thoroughly, and dry the mixture slowly in the mortar by means of a steam or water bath.

If glucose has been used as an excipient, the mass, in drying, will be colored yellowish, owing to formation of decomposition products, the result of the action of the lime upon the glucose. These products do not interfere with the separation of the quinine in a pure state; the latter substance is not injured by the lime.

The dry mass should now be finely powdered and transferred to a Tollen's apparatus,* for continuous percolation, and thoroughly extracted with stronger ether. Upon evaporation of the latter from a weighed dish or flask, the quinine is left in residue. By drying for one hour, at 125° C., the quinine is rendered anhydrous ($C_{20}H_{24}N_2O_2$), and may then be weighed. The weight of anhydrous quinine, in grammes, multiplied by 20.7673, will give the number of grains of sulphate of quinine $[(C_{20}H_{24}N_2O_2)_2H_2SO_4, 7H_2O]$ in the pills examined.

Where a Tollen's extraction apparatus is not at hand, very accurate results may be obtained by simply transferring the dry, powdered lime and pill mass to a small, flat-bottomed flask, and measuring in a known amount of stronger ether, corking well, agitating occasionally, and allowing to stand for not less than 12 hours.

By use of an accurate pipette, an aliquot portion of the clear ethereal liquid may be withdrawn and evaporated cautiously in a weighed dish.

A little experience is necessary to ensure accurate results. The mass may be removed from mortar and pestle almost completely by use of a small steel spatula. In making the paste, previous to the addition of the lime, considerable labor may be saved if the mass is confined to as small a portion of the mortar as possible. With a deep, narrow mortar 3 c. c. of water is often sufficient; the use of more lime may be advantageous in some cases. The dried mass is easily pulverized, is not so light as to be lost in dust, and may be readily transferred from the mortar. The quinine separated is free from impurities.

I find that chloroform cannot be used in this method of assay, owing to the fact that the decomposition products from action of lime on glucose are dissolved by chloroform and impart to the quinine thus separated a red color and very decided excess of weight.

By digestion in a flask with stronger ether, as above described, the following results were obtained: The pills employed were taken at random from a lot of 21,733, which were known to contain 43,690 grains of sulphate of quinine ($7H_2O$). Each pill contained, therefore, 2.0057 grains of sulphate of quinine.

Duplicate results were 2.0113 and 1.9968 grains sulphate of quinine per pill, the average being 2.0041 grains per pill.

Ten of the same lot of pills, extracted by stronger ether in a Tollen's apparatus, afforded 20.0031 grains of sulphate of quinine.

I am inclined to think this method thoroughly reliable, and capable of affording, in every case where carefully followed, 1.99 grains for every 2.00 grains of sulphate of quinine ($7H_2O$) used.

I am indebted to my assistant, Mr. D. L. Haigh, for the careful performance of much of the work here recorded.

HENRY B. PARSONS.

NEW YORK, *Feb.* 16, 1883.

* *Zeitsch. f. anal. Chem.* 1878, p. 320, and New Remedies, 1879, p. 293.

BREWERS' GRAINS AND "STILL SLOPS" AS A FOOD FOR MILCH COWS.

A correspondent asks us to refer him to authorities on the "effects of feeding brewers' and sugar-house or spent grain to our milch cows."

The best *résumé* on this subject that we have seen is that by Prof. C. F. Chandler in Johnson's *Cyclopædia* (article "Milk," division entitled "The Effect of Foods on the Milk.—Feeding."). The titles of several works in which more or less is written on the subject are there given.

As the matter is one of some general interest, we quote the following for the convenience of those interested, who have not easy access to the original:

"Brewers' grains are the staple food in town dairies, and they are much more nutritious than their appearance seems to warrant. Even in the wet condition in which they are obtained from the breweries, and holding from 75 to 77 per cent. of water, they contain a fair proportion of ready made fat and flesh forming matter. Desiccated grains contain about 7 to 8 per cent. of oil and about 18 per cent. of nitrogenous compounds. Dried brewers' grains make good milk, and are fully as valuable as a food for milch cows as barley meal."

"Much discussion has arisen with regard to the propriety of feeding cows on the exhausted barley of breweries, *brewers' grains*, and on the swill of distillers, *still slops*. To the former, used in moderate quantities, there appears no objection whatever; even the latter, 'properly fed in limited quantities, in combination with more bulky food, may be a valuable article for the dairyman; but if given, as it too often is, without the addition of other kinds of food, it soon affects the health and constitution of the animals fed upon it. * * * When this forms the principal food of the milch cows, the milk is of a very poor quality. * * * Its effect on the systems of young children is therefore very destructive, causing diseases of various kinds, and if continued, certain death. * * * The adulteration of pure milk from the healthy cow by water, though dishonest and objectionable in the highest degree, is less iniquitous in its consequences than the nefarious traffic in 'swill milk,' or milk produced from cows fed entirely on 'still slops,' from which they soon become diseased, after which the milk contains a subtle poison, which is as difficult of detection by any known process as the miasma of an atmosphere tainted with yellow fever or cholera. The simple fact is sufficiently palpable that no pure and healthy milk can be produced by an unhealthy and diseased animal, and that no animal can long remain healthy that is fed on an unnatural food and treated in the manner too common around the distilleries of many large cities.' (C. L. Flint, in 'Milch Cows and Dairy Farming'). By the laws of the State of New York the milk of cows fed on distillery swill is declared to be unwholesome and its sale forbidden."

THE BENEFITS OF SANITARY SCIENCE.*

Rome, had her aqueducts furnishing her citizens with pure water, and she also built sewers, but there was nothing like sanitary science as we now understand it. Even England, with all her greatness and wealth of intellect, was the very hot bed of disease, and to her history we turn for instances of the most ravaging of pestilences. What could be more terrible than the Black Assizes, held in Oxford in the year 1577, where all who were present in the court—the judge, the sheriff and three hundred persons—died within forty-eight hours! Or the sweating sickness of 1522, of which the poet Armstrong writes:

> "Infectious horror ran from face to face,
> And pale despair. 'Twas all the business then
> To tend the sick, and in their turn to die.
> In heaps they fell, and oft one bed, they say,
> The sick'ning, dying and the dead contained."

What could be more appalling than the black death of the Fourteenth Century, which reappeared in epidemic form as the plague five times in seventy-two years; in one year (1665) carrying off nearly seventy thousand persons, and in five years 160,000. So terrible was this disease that one writer says: "The plagues of London do commonly kill one-fifth part of its inhabitants." We of the present day living at the North can have no idea of such an epidemic as visited London in the near 1665. Dr. Hodges who practiced in that city at the time, has left a very graphic account of the plague as it appeared in that epidemic, and the narrative of Defoe depicting the scenes of daily occurrence is full of incident and pathos. All the infected houses were closed with their inmates imprisoned within them and were marked with a red cross. Written over the door was, "Lord have mercy on us." Dr. Hodges tells us that "In some houses carcasses lay waiting for burial, in others persons in their last agony. In one room might be heard dying groans, in another the ravings of delirium. No order, age or sex was spared. It was not uncommon to see an inheritance pass successively to three or four heirs in as many days."

When we learn the manner in which the English people of those days lived, we are surprised, not that epidemics occurred frequently, but that they were ever absent. Most of the buildings were of wood and so plastered over that a breath of fresh air was an entire stranger. Our ancestors had to pay a window tax, and so even the light was excluded. The floors of the houses generally were made of loam strewed with rushes, constantly put on fresh without removing the old, lying there in some cases for twenty years, concealing fish bones, broken victuals and other filth." And this is what is called "the good old time!" I have that it would be a glorious day when the youthful science of preventive medicine shall attain its majority. It may be that some think I have overdrawn the picture of the benefits which through it will accrue to mankind. Let us see, then, whether anything has thus far been accomplished by adhering to the principles already established. Unfortunately, the life of our own republic is too short, and the recorded facts too meagre to learn much from a study of its history, but if we turn to Geneva, Switzerland, we shall find records of births and deaths complete for three hundred years. From these we learn that in the sixteenth century the average period of human life was a little over twenty-one years; in this century it has risen to forty years. Then more than one-fourth of the children died in their first year, now less than one-sixth. In the sixteenth century only three per cent. lived to see their three score and ten years; now eighteen per cent. live beyond this age. As many now live to be seventy as then died at the age of forty-three. In Liverpool, before proper sanitary measures were introduced, thirty-eight persons in every thousand died each year, now the number is but twenty-four. I could give such proofs as these almost without limit; could tell you how the mortality in England's Indian army has been reduced from sixty-nine in the thousand to twenty; how during a single decade more lives have been saved in that army than formed the entire British army at the battle of Waterloo; how in Croydon the death rate has been reduced from twenty-five to sixteen; in Salisbury from forty to seventeen, and in Dover from twenty-six to fourteen, but I think I have shown you that the claims of preventive medicine are not the boast of a braggart, but that with proper encouragement and co-operation she will accomplish glorious results.

* From an Address by Dr. J. H. Raymond, Health Commissioner of Brooklyn, in the lecture course of Long Island Hospital.

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Reviews of Books.

JAPAN. ITS ARCHITECTURE, ART AND ART MANUFACTURES. By Christopher Dresser, Ph. D., F. L. S., etc. Scribner & Welford, 1882.

Every one would be glad to know something about Japan if he could be sure of getting at what he wanted without too much trouble. Since Commodore Perry opened the country to our civilization thirty years ago, its arts and manufactures have entered all our households, and strange rumors of this strange people have filled our ears. But meanwhile, books of travel, of history, and of critical commentary have multiplied, and most of us are afraid to begin to read them lest we shall never get through.

Here Dr. Dresser comes to us as a guide and friend, and enough of a philosopher to make his company entertaining and instructive. His book gives a narrative of four months which he spent in travelling through the length and breadth of the island, studying its manufactures and museums. The narrative is animated and amusing, telling just what any one would have seen upon the surface of things if he had enjoyed the same rather unusually favorable opportunities. What the author's special studies, as a student and teacher of decorative art, enabled him to discern, more than would reveal itself to the common eye, he wisely keeps out of this narrative, embodying his observations and reflections in a series of essays which occupy the last half of the volume. For these the personal narrative affords an admirable preparation.

These essays treat separately of pottery, lacquer work, metal work and the decoration of stamped and woven fabrics, with a final chapter upon paper-making, basket-making and other minor industries, and an introductory chapter upon architecture and the general principles of design. These are all admirable and interesting, and tell just what one wishes to know, except, perhaps, the last mentioned, which seems somewhat meagre and lacking in ideas. It is rather discouraging, at this late day, to find a leading writer upon decorative art quoting the crude and ill-digested "Principles" prefixed to Mr. Owen Jones' "Grammar of Ornament," as if they were a species of gospel. The fact that they are contradicted by almost every page of the Grammar itself, has frequently been pointed out. Better and more intellegent is the second chapter, upon analogies and symbols, in which the origin of the special decorative forms found in Japanese art is discussed, and their possible historical relations with cognate forms found in India, Persia, Arabia, Egypt and Greece is pointed out. Dr. Dresser presents with great force the value of such a comparison of decorative forms as a means of tracing the migrations of races, their commercial relations and their kinship by blood. The chapter closes with an enumeration of the curious and surprising resemblances between the arts and civilization of Japan and those of Ancient Egypt, in character rather than in specific forms, adding new and independent testimony to facts to which attention was long ago directed by Mr. Fergusson. But while both peoples seem to have carried the manufacturing arts to the highest perfection, absolutely without the aid of machinery, and both to have been controlled in all social, religious and political matters by strict fetters of custom, the Japanese exhibit to this day a freedom of mind and facility of invention to which their ancient prototypes offer no parallel.

Although Dr. Dresser presented himself in Japan as the bearer of certain objects contributed in London towards the formation of a Museum of European art at Tokio, he seems to have used the opportunities this office afforded him for directing the attention of the Government to the means rather of preserving their own manufactures than of adopting foreign methods. It is satisfactory, moreover. to be able to infer from what he says, that, in general, as good work is done now as at any past time, and that a reaction against innovation is already taking place, so that industries which, after the fall of the Daimios, in 1868, seemed likely to perish for want of their patronage, are reviving under the stimulus of foreign trade. Still the total impression left by the book is that a mercenary and commercial spirit cannot but be fatal to an art which owes its perfection, as these pages plainly show, to a singularly pure and universal spirit of artistic devotion. This serene and childlike temper seems to have been greatly fostered by the purity and mildness of the two religions that have contended for, or rather shared, the superstitious reverence of his hitherto happy people.

The illustrations, though needing color for their full efficiency, are ample and helpful. Many of them are engraved by Japanese artists especially for this work; yet the book would be readable and entertaining without them. But it sadly needs a map and a sufficient table of contents.

THE TOWERS AND STEEPLES DESIGNED BY SIR CHRISTOPHER WREN. By Andrew T. Taylor, Architect. London: B. T. Batsford, High Holborn.

Mr. Taylor's essay, which recently gained the medal of the Royal Institute of British Architects, though encumbered with some paragraphs of amateurish fine writing, as prize essays are apt to be, is creditable and serviceable. The illustrations consist of fifty-one elevations, or perspective views, and sixteen sections of the towers and spires erected by Wren after the fire of London. Though many of these structures are pretty ugly, fantastic in idea, and paltry in execution, others of them have a felicity of composition that makes them profitable subjects of study and quite justifies their reputation.

The drawings are sufficient for their purpose, though apparently not very accurate. At any rate, the elevations and sections seem not always to hang together.

Besides the introductory essay, which contains some pertinent and not uninteresting historical information, a brief account is given of each structure, giving dimensions and other statistics, and sometimes running on into critical expressions, generally of praise, which might as well have been omitted. At the end is a somewhat perfunctory plea for the preservation of the churches for which there is no further use, or at least, for that of their towers. It is, altogether, a book for every architectural library of good size, and might prove suggestive, in these Queen Anne days, to the active practitioner.

BOOKS RECEIVED.

THE CONDITION OF NIAGARA FALLS AND THE MEASURES NEEDED TO PRESERVE THEM. Eight letters published in the New York *Evening Post* the New York *Tribune* and the Boston *Daily Advertiser* during the summer of 1882, by J. B. Harrison, New York, N. Y., 1882.

SUICIDES IN NEW YORK CITY DURING THE ELEVEN YEARS ENDING DEC. 31, 1880. By John T. Nagle, M.D. Read before the American Public Health Association, at Savannaht Ga., Nov. 30, 1881. Cambridge: *The Riverside Press*, 1882.

QUARTERLY REPORT OF THE CHIEF OF THE BUREAU OF STATISTICS, TREASURY DEPARTMENT, relative to imports, exports, immigration and navigation, for the three months ending Sept. 30, 1882.

FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF KENTUCKY, 1882.

An action was brought by a plumber in the Croydon, England, County Court against a civil engineer for upwards of $150 for the erection of a lavatory. Defendant made a counter-claim of $600 on the ground that the work, being improperly done, sewer air escaped into the house, and caused the illness of six members of the household, and the death of his son. He, therefore, claimed the doctor's bill and other expenses. The judge struck out the plaintiff's claim and gave judgment for the defendant.

An iron platform suspended inside the stand pipe now being erected for the Nashville water works for workmen to stand on, fell to the bottom a distance of 68 feet recently, through the giving way of the supporting chains, killing one workman and seriously injuring another.

The attention of the health officers of Philadelphia, was last week directed to the existence of an epidemic in a lane of that city. The corpses of two persons who had died of it had remained without attention for a week.

Residents in a certain district of Philadelphia, have complained to the Board of Health, that malarial fever is caused by the accumulation of the sewage of 138 houses in a pond in a sunken lot, and that ice is being gathered from this pond.

Senator Chapman of the Ohio Legislature, has a bill creating the State board of health to consist of seven members appointed by the governor, with the confirmation of the Senate. The bill requires the board to meet quarterly at Columbus, and a veterinary surgeon is to be appointed who shall investigate the existence of epidemic diseases among domestic animals.

The Hartford milk inspector has examined 36 samples of milk from city milkmen and finds seven adulterated either with water or skim milk.

GUTTER FLUSHING IN NEW ORLEANS.

The Committee on flushing, of the New Orleans Auxiliary Sanitary Association, in its last report, presented Jan. 12, in 1883, by its Chairman, Mr. Edward Fenner, comments as follows:

"The erection of the flushing pumps was considered by the Sanitary Association but the initial step toward correcting the long existing evil of defective drainage. While performing the important service of purifying the gutters of every perpendicular street, by carrying rapidly to the drainage canals the filth of the most populous portions of the city, it must be borne in mind that it greatly assists the cleaning of the gutters of the streets running to the canals by the corporation gangs. The perfect success of this system has but two obstructions.

"1. The defective grade and irregular capacity of many gutters.

"2. The inability of this committee to estimate the means that may be at its disposal during the current year.

"To avoid the perplexity consequent upon unknown annual contributions, this committee petitioned and had granted to them by the late city government, an annual sum of ($10,000) ten thousand dollars, to be paid in monthly installments. Of that appropriation $5,833.33 has been paid. The remainder may never be paid. The Executive Committee have petitioned the present city government to include in the budget for 1883 the sum of ($10,000) ten thousand dollars towards defraying the cost of runn ng the flushing pumps—a sum not perhaps in excess of the expense of cleaning (but not purifying) by the city gangs the great length of gutters rendered innoxious by a stream of fresh river water.

"It remains to be seen whether an amount so insignificant, when contrasted with the object to be attained, can be spared from the reserved fund of the city.

"This committee has frequently called your attention, and that also of the city government, to the existing condition of the drainage canals. At the earnest solicitation of of your Executive Committee, the Administrator of Improvements, Mr. John Fitzpatrick, did undertake, in the month of January last a plan of improvements to the drainage canals, which, if carried to completion, will result in incalculable benefit to the health and prosperity of the city.

"If the work so auspiciously commenced be now discontinued, it will prove a great calamity, not only in retarding, it may be for years, a reform of the utmost importance, but all the money it has cost might as well have been thrown into the river. If one year is permitted to pass before labor is resumed, the canals will relapse into their former filthy and unhealthy condition.

"From this deplorable result of legislative and municipal neglect and ignorance, it is the duty of the People's Association to rescue this city. That our citizens may know that this committee base their allegations upon facts, a few instances of what we term 'neglects' and 'ignorances' may be stated.

"Galvez Canal was paid for as being eight (8) feet deep; yet the work, so well done by the Administrator of Improvements last spring, developed the fact that at certain points the excavation did not exceed two feet in depth, and the original stumps and roots remained. Thus the main receiving canal for the drainage of the most populous portion of the city, eighteen feet wide and 5,156 feet long, as stated by Dr. Jones, 'is an immense mass of filth accumulated from the gutters and open sewers of the city.'

"The Toulouse Canal, intended to be the direct outlet from the Galvez Canal to the Bienville draining wheel, is a mere ditch, ten to twelve feet wide and from one and a half to two feet deep. Again, the drainage of Canal street depends entirely upon a narrow, inadequate trunk or conduit in Claiborne street which is also taxed with the drainage and flood water of Customhouse, Bienville, Conti, St. Louis and Toulouse streets, now leave the route of the water to its final outlet at the Bienville wheel.

"Millions of the people's money have been squandered, and years of engineering skill have been consumed in giving to the city of New Orleans a system of drainage such as we have in part described, which, in the words of Dr. Joseph Jones, President of the Board of Health, has contributed during the past thirty-four years toward sending to an untimely grave 118,094 people—an estimated loss to the city of one hundred and eighteen millions of dollars.

"As stated, Mr. John Fitzpatrick, Administrator of Improvements, at the earnest solicitation of this association, made great exertions to correct the evils we have pointed out.

His expenditure was.....	$32,799 00
Whilst this committee expended for lumber, labor, pumping, etc., in aiding the work.....	4,247 91
And had expended in preparation for the excavations for dams and gates, etc...	2,444 51
Total expenditure by this association.....	$6,692 42
Making a total of.....	$39,492 22

"If this great work is now abandoned but little benefit will accrue from the money already spent, and it may result in total loss, as the canals will rapidly fill up and relapse into their former filthy and dangerous condition. What is the history of municipal undertakings but a record of schemes of improvements exciting great expectations seldom realized during the incumbency of the originators; abandoned by the newly elected for some plan destined to share the same fate."

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Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

SOCKET WRENCH.

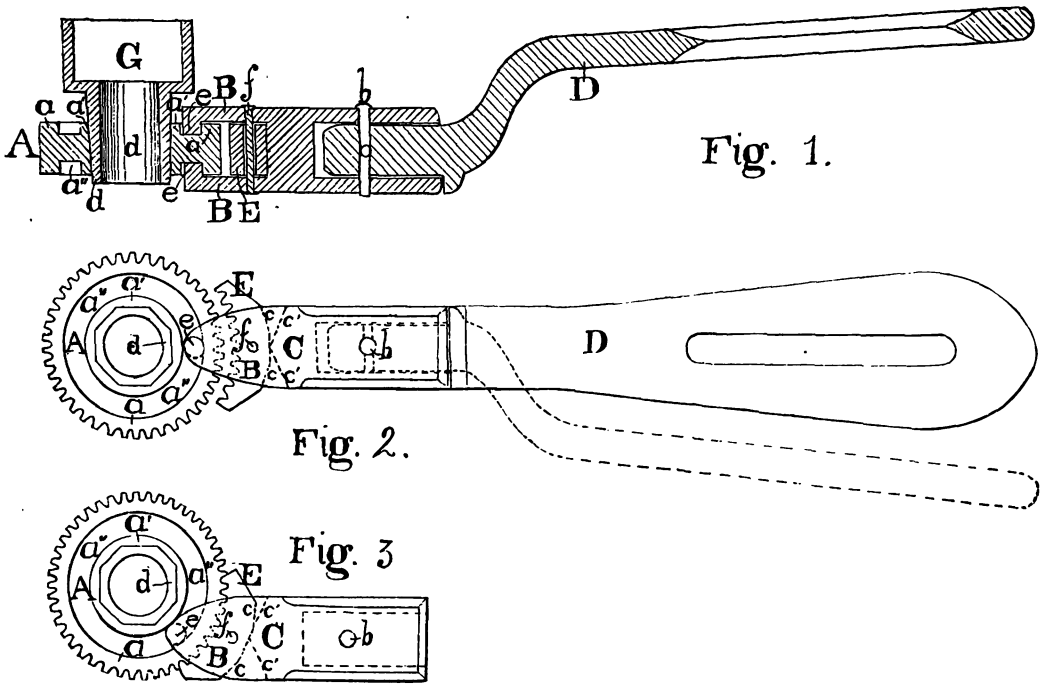
The tool described below is the invention of Mr. Wm. G. Pride, of 326 Reid avenue, Brooklyn, N. Y. It is designed for turning nuts, drills, etc., in confined places.

The accompanying drawings are one-half full size. Figure 1 is a section through the axis of the cylindrical head and the middle line of the handle when in the disengaged position shown in Fig. 2, which is a plan or view of the under side of Fig. 1, while Fig. 3 is a view of the same side, showing the parts engaged, as in use.

The cylindrical head, *A*, is provided with teeth extending across the edge around the whole circumference, and in each face between the rims *a* and *a'* is a channel or groove *a''*, running parallel with the circumference. Through the centre of the head, perpendicular to its faces, is a slightly tapering, hexagonal opening, in which is inserted the socked *d*, which has a square opening, *G*, at its upper end to receive the nut to be turned, the shank or lower portion being made hollow to admit the portion of the bolt extending beyond the nut. The socket may also be attached at one end of a stem, the other end of which is made to fit the opening in the head, for use in specially confined places where there is room only for the socket. This nut socket may be replaced by another form suitable for holding drills. For use with the latter a breast rest or other contrivance is provided to enable the operator to force the drill in while turning it.

The lever bar *C* is slotted at one end, and at the extremities of the prongs or jaws, *B B*, are studs, *e e*, projecting inwards and fitting into the groove *a''*, thus attaching the lever bar to the head while allowing it to play freely around it. In the back of the slot is pivoted on the pin *f* a vibrating segmental shoe or brace, *E*, the front edge, or that next the head, being an arc of a circle of the same diameter as that of the cylindrical head, and having teeth corresponding to those on the circumference of the same. When in the engaged position the edge *c*, on the back of the segmental shoe, rests against the surface at the end of the slot, which is indicated by the lines *c' c'*. The action of the wrench may now be understood, we think, from the plans Figs. 2 and 3, without further explanation. The operation, it will be seen, is like that of a ratchet-drill or pawl-wrench.

In the other end of the lever bar is a square socket to receive the handle *D*, which is held in by a pin, *b*. The handle is curved, and may be inserted in any one of four positions for convenience in operating it in different locations.



Construction Notes.

CHICAGO.—The county commissioners, Feb. 12, received the following bids for reconstructing the ventilating and sewerage arrangement of the jail and criminal court buildings: J. J. Wade, $11,500; W. B. White, $10,300; Bassett & Beaver, $9,447; M. B. Bailey & Co., $9,800; Richard Graham, $11 500; Alex. W. Murray, $8,608; James H. Roche, $9,200; Andrew Young, $8,899; Bufton & Boyd, $7,900.

NAHANT, MASS.—The desire of summer residents for a water supply has caused the matter to be earnestly discussed in the town, and at the next town meeting steps will probably be taken toward securing one. The two projects which are most discussed are the obtaining the the water from the city of Lynn or from Sluice pond in Lynn, owned by the Lynn Aqueduct Company, which is recommended by Engineer Bowditch, in case water cannot be obtained from Lynn.

ROCHESTER, N. Y.—The contract for the iron pipe for power purposes for the Lyell street lift bridge was awarded the 13th inst. to the Mellert Foundry and Machine Co., of Reading, Pa., at $39.58 per gross ton. The contract for the bridge, which was originally let to the Hudson Bridge Co., has been transferred, at their desire, to the Pittsburg, Pa., Bridge Co.

NEW YORK.—The contract for supplying the electric lighting apparatus for the East River bridge has been awarded to the United States Illuminating Company of this city for $15,500. This covers the entire plant for seventy lights including the two engines which are to be stationed on the Brooklyn side. Each engine will run an independent circuit, feeding alternate lamps on both sides of the bridge so that only every other lamp will be extinguished if an accident happens to one engine. By contract the work is to be completed in 60 days.

BUFFALO, N. Y.—Bids received for brick for the main sewer which is to be constructed according to the plans of Col. George E. Waring, Jr., were all informal, and that part of the work has been re-advertised. On American cement, after the decision to award to a Rosendale bid, the local interest in favor of Buffalo and Akron led to a postponement. Portland cement, 10,000 barrels, was awarded to Sherman Bros. & Co., of Buffalo, at $280 (for Brooks, Shoebridge & Co.). Iron castings at 3 cents per pound to Jacob Genther, Buffalo.

MOMENCE, ILL.—The Chicago *Tribune* of the 12th inst. says: It is reported that a syndicate is being formed to buy the dam and mill property at Momence, Ill., which is to be sold at Kankakee next Tuesday. The intention of the syndicate is to make extensive improvements to the property and utilize the immense water-power there. If this scheme is carried out, it will prevent the drainage of the Kankakee marshes, for the accomplishment of which a bill is now pending in the Legislature, at an expense of $650,000. The marsh lands were surveyed last summer by Prof. Campbell by order of the State, and he recommended that they be drained.

REGINA, N. S.—A water company has been formed to bring water from Boggy Creek, three miles distant.

MEMPHIS, TENN.—The following bids have been received at the Treasury Department, Washington, for the construction of the Marine Hospital Buildings, Memphis, Tenn.:

	Extension Building.	Two Wards.	Surgeon's House.	Kitchen, Dining-room and Laundry.	Stable and Dead House	Total.
John Reid....	$8,725	$7.500.00	$6,300	$7,700	$1,050	$38,775
D. J. McCarty	11,360	10,172.00	8,291	11,979	1,500	53,474
Robt Davids'n	12,999	9,892.50	8,481	12,256	2,171	55,698
Belknap & Co.	8,350	7,625.00	6,400	8,900	1,300	40,200
F. T. Paradice	8,556	7,283.50	7,290	7,493	982	38,888

BIDS FOR WATER MAIN FOR GOVERNMENT INSANE ASYLUM.

WASHINGTON, D. C., *Feb.* 7, 1883.

To the Editor of THE SANITARY ENGINEER:

I take the liberty of asking for some information, if you have it, in regard to the proposals for laying a water main, as advertised in your paper, from Greenleaf Point to the Government Hospital for Insane. Bids were to be opened some time during January but I have seen no mention of it either in any of the city papers or yours.

Respectfully, JAMES RAGAN.

[We are informed that the bids received under the advertisement, were not such as the appropriation would admit of being accepted, and the whole matter has been indefinitely delayed.

PROPOSALS RECEIVED FOR GOVERNMENT DREDGING.

In Saginaw River in front of Bay City, Mich., opened February 14, 1883, by Major F. U. Farquhar, Corps of Engineers, U. S. A., the three lowest bidders were:

Castle Sutherland, East Saginaw.....$0.25 per yard.
D. W. McConnell, Buffalo, N. Y..... .35 per yard.
Thos. M. Hubbell, East Saginaw. ..... .37 per yard.

The bids submitted varied from 25 cents to 48 cents per cubic yard.

In Saginaw River, above Bay City, Mich., opened February 14, 1883, the three lowest bidders were:

Gaskin, Stickney & Crane, East Saginaw.. $0.37½ per yard.
Thos. M. Hubbell, East Saginaw..... .39 per yard.
David McConnell, Buffalo, N. Y..... .40 per yard.

The bids submitted varied from 37½ cents to 52 cents per cubic yard.

At the bar at the mouth of Saginaw River, Michigan, opened February 14, 1883, the three lowest bidders were:

David McConnell, Buffalo, N. Y..... ..$0.30 per yard.
Castle Sutherland, East Saginaw..... .60 per yard.
George Talbot, Buffalo, N. Y..... .65 per yard.

The bids submitted varied from 30 cents to 96 cents per cubic yard.

WANTED, BY NEW YORK DEPARTMENTS, 15,000 feet of hose, 2½ inches internal diameter. Proposals will be received until February 28, by the Fire Department, 155 and 157 Mercer street. Also, by the Fire Department, until February 28, four steam fire engines, each to weigh not more than 4,700 pounds when fully equipped—boilers 30 inches in diameter, cylinder 8-inch diameter and 7-inch stroke.

The Boston Board of Aldermen have requested the Mayor to petition the Legislature to obviate the necessity of including in the tax levy of Boston the amount of the interest on the Mystic Water bonds. The Mystic Water Works supply the towns of Everett, Chelsea and Somerville as well as part of Boston. By the annexation of Charlestown to the city a few years ago, the works, which had been built independently, were included in the city,

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and the debt was assumed by the city. The outlying towns now take their water under contracts with the city, and the object of the action proposed, is to compel these towns to share the burden of the cost of the works, the benefits of which they receive. As one of the aldermen remarked in the debate on the proposition, if there is a deficiency now, the city has to pay the whole of it; if there is a surplus, the outside towns share the benefit.

The city of Harrisburgh, Pa., is about to take a new departure in the management of its water works. Heretofore they have been in charge of a committee of the city council. The present committee seem to be men of good sense, for they have agreed upon an ordinance which they request the council to pass, relieving them of the responsibility and placing the department in charge of a superintendent who is to appoint all his own subordinates and give bonds for the faithful performance of his duties. This officer is to be elected by the council, but no person shall be eligible who has not been examined by and received a certificate of capacity from a Board of Examiners appointed by the Mayor.

Col. William Ludlow was elected by the Councils of Philadelphia on Feb. 15, Chief Engineer of the Water Works; William Dixey was at the same time re-elected Commissioner of Public Property.

WASHINGTON, D. C.—Cast-iron and fire-proof columns for new pension office building: James Peviotlett, Columbia, Pa., $88 each; J. D. Manshbank & Son, Philadelphia, $109; Wight Fire Proofing Company, Chicago, $69; Wight Fire Proofing Company, Chicago, $62; Wight Fire Proofing Company, Chicago, $48; C. Rittenhouse & Son, Norristown, Pa., $157.25; Central Iron Works, Brooklyn, N. Y., $69; Central Iron Works, Brooklyn, N Y., $110; Central Iron Works, Brooklyn, N. Y., $87; W. H. Jackson & Co., New York, $74,50; Mitchell & Shepherd's foundry, Philadelphia, Pa., $85; Tredagar Company, Richmond, Va., $73; Bartlett, Hayward & Co., Baltimore, Md., $65; James J. Healy, Brooklyn, N. Y., $93; James J. Healy, Brooklyn, N. Y., $46; George White & Co., Washington, D. C., $61.20; Phœnix Iron Company, Philadelphia, Pa., $67; Phœnix Iron Company, Philadelphia, Pa., $92.50; Phœnix Iron Company, Philadelphia, Pa., $106.25; C. A. Schneider's Sons, Washington, D. C., $81.63.

DANVILLE, VA.—Marble mantels for Custom House and Post Office: E. Fitch, $471.60 and $441.60; E. Hall, $456.00 and $396.00; A. Klaler, $437.00. E. Hall's bid of $456.00 was accepted.

Encaustic tiling: American Encaustic Tile Co., $528.00; U. S. Encaustic Tile Co., $538.00; T. Aspinwall & Son, $583.00; imported tiles, Henry Dibbles, $750 00. The bid of the American Encaustic Tile Co. was accepted.

PLUMBING LAW VIOLATIONS.

No violations of the plumbing law were reported to the Health Department of this city during the week ending last Saturday.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Canal st, No. 276, br store; cost $8,000; o, David W. Bruce; a, J. B. Snook; b, John Demarest and Wm. A. Vanderhof....329 and 331 Canal st, br store; cost $75,000; o, Wm. A Lorillard and Chas. G. Spencer; a, J. B. Snook; b, Robinson & Wallace and W. Germond & Co....332 Canal st, and 39 and 41 Lispenard st, br, iron and st store; cost $75,000; o, John Clark; a, Jobst Hoffmann....387 Grand st, br store; cost cost $12,000; owners, Adolf and Emanuel Alexander; architect, J. Boekell....453 37th street, n s, 100 e 10th avenue, brick tenement; cost $16,000; o, James McLoughlin; a, J. Sexton; b. J. McLoughlin ...38th st, n s, 125 w 1st av, four br ten; cost each $18,000; o, John J. MacDonald; a, John Brandt....202 43d st, s s, 80 e 3d av, br ten; cost $12,000; o, John Murphy; a, Babcock & McAvoy; b, not selected ....246 47th st, w, bet Broadway and 8th av, br storage; cost $20,000; o, Morgan & Bro.; a, J. M. Dunn....465 47th st, w, Conn. br st flat; cost $18,000; o, a, and b, James B. Gillie and Alexander Walker.... 56th st, s s, 101 w 2d av, three br ten; cost ea $13,000; o, James Williams; a, A. B. Ogden....75th st, s s, 100 w 1st av, br bakery and stable; cost $9,000; o, —— Droste; a, W. Jose....317 75th st, E, being 250 e 2d av, br ten; cost $9,500; o, Patrick Ducey; a, A. T. Wilson... 406 77th st, E, br ten; cost $14,500; o, John B. Dingeldein; a, J. Brandt....2306 1st av, bet 117th and 118th sts, br store and ten; cost $15,000; o, Teresa Coogan; a, Cleverdon & Putzel....115th st, s s, 245 w 5th av, five br st dwels; cost ea $15,000; o, James Madden and James Mara....135th st, s s, 150 w 8th av, three br ten; cost each $15,000; o, Patrick Whelen; a,. F E. Verder... 134th st, n s, 150 w t8h av, two br ten; cost each $13,000; o and a, same as last....155th st, n e cor Morris av, br piano factory; cost $10,000; o, Mary A. Dunham.

ALTERATIONS, NEW YORK CITY.

64th st, s s, 250 e of Eastern Boulevard, raised three stories; cost $12,000; o, Neidlinger, Schmdit & Co.; b, J. & L. Weber....504 14th st, br exten; cost $3,000; o, Campbell Mining and Reducing Co.; b, S. Lowden and J. Farrell....2d av, s w cor 7th st, alter to fourth floor; cost $4,000; o, Jacob H. Miller; a, J. Hoffmann....7 61st st, E, br exten; cost $15,000; o, Edward Tuck; a, S. D. Hatch; b, R. L. Darragh & Co., and J. Elgar....97 and 99 Water st, made into two stories; cost $8,000; o, Frederick Robert; a, H. E. Ficken....99 Bowery, br exten; cost $7,500; o, John R. Ackerman; a and b, E. Smith & Co ...5th av, n w cor 20th st, br exten; cost $70,000; lessees, Herter Bros.; a, W. Schickel ..164 10th st, W, three story br exten; cost $4,000; o, Thomas Parsons, on premises; a and b, not selected ....276 Houston st, E, add two stories; cost $2,500; o, George W. Moore; a, W. Graul....24th st, s s, 187 w Broadway, adj Fifth Ave Hotel, raised to six stories; cost $40,000; o, Amos R. Eno; a, D. & J. Jardine....126 Broome st, n w cor Pitt st, add one story; cost $2,500; o, Bernhard Steen; a, T. J. Bier.

BROOKLYN.

Waverly av, w s, 186.8 s Lafayette av, two story brick stable; cost $6,000; o, Wm. H. Hill; a, G. L. Morse....Rutledge st, n s, 82 to 122 e Bedford av, two br st dwels; cost ea abt $4,200; o, R. Taylor; a and b, J. H. Devoe....Poplar st, n w cor Poplar pl, brick asylum; cost $47,000; o, Brooklyn Children's Aid Society; a, M. J. Morrill; b, Jas. H. Stevenson and J. S. McRea....14½ and 16 Adams st, s s, 137.6 e Broadway two fr dwel; cost each $2,500; o and b, Chas Meyer; a, Th. Engelhardt.

BROOKLYN ALTERATIONS.

139, 141 and 143 Atlantic av, No. 139 br exten; cost $3,000; o, Jas O'Brien; a, Thos. Houghton.

BOSTON, MASS.—467 And 469 Treamont st, 1 br dwel and store; o, Mary S. Knowlton ...Central av nr Washington st, 1 fr dwel; o, Wm. E. Potter; b, John E. Crosby....Pratt st nr Linden st, 1 fr dwel; o, Isaac Pratt, Jr.; b, W. B. Cameron....Cambridge st nr North st, 1 fr mechanical; o, Patrick F. O'Keefe; b, Jas. Green ....Dorchester av Commercial st, 3 in block, fr dwels and stores; o, Mary A. Jones....Dorchester av nr Commercial st, 1 fr dwel and store; o, Patrick Rogers....18 Mills st, 1 fr dwel; o, Benj. F. Bean; b, Benj. F. Bean....Harvard st, 1 fr Mechanical; o, Patrick F. O'Keefe; b, Jas. Greene.

CHICAGO, ILL.—Cor. Mather and Clinton, br store; cost $17,000; o, Schills & Cossmann; a, W. Strippelman; b, Henry Appel... Rice nr Robey st, 10 cottages; cost $18,000; o, W. D. Kerfoot & Co., agents; b, by the day....Cor Larrabee and Center, br stores and flats; cost $25,000; o, Ricke & Hibbard; a, J. C. Zarbell; b, Lund & Gilbert ...Cor Dearborn and Thirtieth st, br flats; cost $30,000; o, Thomas Welch; a, Geo. O. Garnsey; b, not decided.... 3814-3819 Johnson pl, 4 br houses; cost $9,000; o, F. D. Reynolds; a, J. C. Lane; b, F. D. Reynolds....2819 Cottage Grove av, br dwel; cost $5,000; o, Henry Delaney; b, by the day... 564 N Ashland av, br dwel; cost $7,000; o, John Gerson; a, H. Meissner; b, H. Delfosse.

NEW HAVEN, CT.—Howard av cor Putnam, br blo.k; cost $10,000; o, R. C. Lyon; b, L. V. Treat ...374 State st, br store; cost $5,000 o, Mrs Mary A. Pitkin....Orange cor of Crown, br store; cost $25,000; o, James K. Townsend; a, L. W. Robinson; b, Chatfield & Grant....Harvard av, cor Spring st, fr dwel; cost $5,000; o, E. A. Bickley....Ferry cor Chapel st, fr store and dwel; cost $5,000; o, Henry Kanold....15 Pearl st, fr dwel; cost $5,000; o, A. J. Beers; b, Clark.. .Chapel nr Union sts, br printing office; cost $9,000; o, C. L. Mitchell; a, L. W. Robinson; b, C. D. Kinney.

PHILADELPHIA, PA.—Wharton, w of 18th st, dwell; o, Harry Webster ...Manayunk av and Cedar, dwell; o, Robt Boon...Bunghurst w of Wakefield, two dwell and one stable; o, John Rufe....170 Dock st br st; o, C. H, Jacoby... Locust w of 13th, three dwell; b, Robertson & Bryan....Lehigh av we of 5th, five dwells; b, Fred. Lambrecht....Reese st, e of 4th, four dwell one stable, b, Fred Lambrecht... 1037 Chestnut, store; b, P. H. Somerset.... Jefferson and Mansion av, two dwell; o, Patrick Farley....Race, n w cor 11th, factory and st bldg; b, Kister & Orem....710, 712 n 3d, store bldg; o, W. H. Cooper....730 Bainbridge two dwell from church; b, N. O'Malley....Mould st, e s, n of Wharton st, seven dwells; o, Alex Beck....1732 Grayson st, dwell; o, J. F. Scott....Cantrell st, n s, w of 7th st, dwell; con, Smith & McHenry....429 Garden st, shop; con, S. W. Moore....Unity st w, n s, e of Penn, store; o, Holme Bros....Scott st, s s, bet 9th and 10th sts, four dwells; con, Jas. McCall....Reese st and Lehigh av, s e cor, st and dwelling; con, C. H. Keyser....5th and Hunting don sts, n e cor, st and dwell; con, Chas. O'Kronlowicz....331 and 333 Walnut st, office bldg; o, Liverpool & Globe Insurance Co. ....5th and Tioga sts, saloon; con, Louis Walter....42d st, e s, n of Haverford st, dwell; con, Lewis C. Smith....20th st, e s, n of Fairmount av, dwell; o, J. B. Evans....Palethorp st, w s s of Susquehanna av, 12 dwell; con, Chas. Bossert....12th st, e s n of Columbia av, tavern and dwell; o, Chas. Casper....Lombard st, s s, w of 6th st, stable & st house; o, Edw. Shay..Martha st, e s, s of Lehigh av, dwell, con, J. C. Stackhouse....Howard st, e s, n of Lehigh av, factory; con, Jas. McCartney.. .Amber st, w s, s of Lehigh av, dwell; con, Thomas L. Kelly....28th st, e s, s of Oxford st, two dwell; con, W. H. Lower....Bridge st nr Walker st, ice house and brewery; con, Jas. B. Doyle....29th st, e s, above Brown st, wash house; con, Jas. B. Doyle....5th and Willow sts, s e cor, ice house and brewery; con, J. B. Doyle....113 Edward st, ice house; con, Jas. B. Doyle....Ellsworth st, n s e of 21st, factory; con, Thomas Little....York st, s s, bet 16th and 17th sts, dwell; o, Mooney & Crookson....410 Maria st, dwell; o, Emma H. Lentz ...3625 Turner st, dwell; Wm. W. Scargle.

Alterations and additions.—Germantown av, and Nicetown Lane, n w cor, add to factory; con, Benj. Walker ..:1202 7th st, s, two br bldgs; o, Robt Williams....1217 Vienna st, br bldg; o, Jacob Schneider.....513 Bainbridge st, add to shop; o, W. H. McArdle....1417 Fairmount av, add to dwell; con, Jno. England ....N of Reading R R nr Pulaski av, add to hammer shop; add to hack bldg; add to gas bldg; con, T. H. Doan ..617 e Dauphin st, add to shop; o, T. P. Thomas....1111 South st, br bldg and new front to store; con, M. McConnell....107, 109, 111 n 40th st, three br bldgs and bath; con, Jno. A. Palmer.

LAKE VIEW, COOK CO., ILL.—Swiss Gothic house; cost $12,000; o, Carlisle Mason; a, W. L. B. Jenney; b, J. C. Robinson....Lake View, at Halsted and Belden av, br house for professors; cost, $30,000; o, Presbyterian Seminary of the Northwest; o, W. L. B. Jenney; b, Moss & Chambers....Hyde Park at Fiftieth street and Greenwood av, Queen Anne fr house; cost, $13,000; o, Rev. Dr. Galusha Anderson; a, W. L. B. Jenney; b, J. C. Robinson.

EAU CLAIRE, WIS.—Opera house, br and st; cost, $50,000; o, Eau Claire Opera House Co.; a, Geo. O. Garnsey; b, by the day....fr residence; cost, $20,000; o, Mrs. Ole Bull; a, Geo. O. Garnsey; b, S. M. Bangs ...fr residence; cost, $30,000; o, Geo. B. Shaw; a, Geo. O. Garnsey; b, by the day....fr house; cost, $20,000; o, Hy D. Davis; a, Geo. O. Garnsey; b, F. E. Hinds....fr house; cost, $20,000; o, J. G. Thorp; a, Geo. O. Garnsey; b, S. M. Bangs.... fr house; cost, $6,000; o, R. H. Chute; a, Geo. O. Garnsey; b, S. M. Bangs... br and st house; cost, $25,000; o, General Moon; a, Geo. O. Garnsey; b, not decided....fr house; cost, $7,000; o, Dr. D. W. Day; a, Geo. O. Garnsey; b, not decided.

WASHINGTON.—3 A, bet 6th and 7th, br dwel; cost, $6,000; o, D. B. Groff....10 10th and H, br dwel; cost 7,000; o, A. McIntosh.... 2 Penn. av, br dwel; cost, $7,000; o, Jno. E. Henel.

ST. LOUIS.—Washington av, bet 9th and 10th sts, br build; cost, $133,600; o, Tutt & Londerman; a, F. D. Lee; b, Weber & Voulschen....Olive st, bet Jefferson av and Beaumont st, two adjacent br dwells; cost, $10,000; o, J. M. Witte; a, A. Grable; supt, S. H. Hoffman; b, sub-let....15th st, bet Cass av and O'Fallon st. two adjacent br dwells, cost, $6,500; o, H. Tiemann; b, Wm. Springmeyer.

WORCESTER, MASS.—Harvard, br dwel; cost, $10,000; o, F. P. Goulding; a, S. C. Earle; b, S. H. Batchellor... Highland, br church; cost, $12,000; o, Baptist Society; a, S. C. Earle; b, H. W. Eddy. ... Southbridge, br carpet mill; cost, $7,000; o, M. J. Whittall, a, S. C. Earle; b, H. W. Eddy... Salem, br stores and ten; cost, $30,000; o, T. M. Rogers; a, Fuller & Delano; b; A. M. Kelley.... Pridmont, fr dwell; cost, $4,500; o, Dr. Ellinwood; a, A. P. Cutting; b, A. H. Drake....Dover, fr dwell; cost, $2,500; o, W. S. Knight; a, Barker & Course; b, W. S. Knight.

MISCELLANEOUS.

ALBANY, N. Y.—A Catholic Cathedral is to be built here to cost $400,000.

BOYCE, LA.—Work on the buildings of the Texas Pacific is progressing here. Material for building a large hotel is now on the ground.

BROOKVILLE, ONT.—Custom and Post Office, cost $35,000; o, Government; a, Government architect; b, J. Thompkins.

CHICAGO, ILL.—Bachelors apartments in connection with the Union Club House are to be erected on Washington Place, the project being under guidance of H. H. Porter and V. C. Turner, who are forming a stock company; also an apartment building for families; the two to be connected by means of the restaurant. Cobb & Frost, architects. B. W. S. Clark is the architect for a block of nine dwellings on Wabash avenue, near 35th street at a cost of $130,000.—Bids to build the new depot on the poor-house grounds have been made as follows: Thomas Dowling, $3,450; Smith & Goebel, $4,523; McGraw & Downey, $3,833; John H. Mason $2,560.—The Chicago Metal Felloe Company will build soon, at corner La Salle and 54th streets.

CINCINNATI.—3rd near Elm sts, 2 5-st stone fronts; cost $30,000; o, J. S. Armstrong; b, Henry Bevis.

DOWAGIAC, MICH.—Will have a town hall, to cost $7,000.

DYERSVILLE, IND.—Machine shops are building, to cost $50,000.

ENGLEWOOD, ILL.—It is probable that a large hotel will be erected by D. G. Hamilton, at Indiana, Michigan and Wabash avenues, 62d and 63d streets....Dwelling, Queen Anne style, for F. A. Adams. B. W. S. Clark, architect.

EVANSTOWN, ILL.—Of prospective improvements are two villas on Chicago avenue, frontage of Lakeside Block, at $5,000 each, and a building on n. e. corner to correspond.

EAU CLAIRE, WIS.—Plans for the erection of a commodious hotel are being made, work to commence with opening of season.

EAST SAINT LOUIS, ILL.—Flour mill to be built by J. B. M. Kehlor. Cost will be $500,000.

FLUSHING, MICH.—The Methodist church, burned down, will be replaced by a new brick structure, in the spring

HAMLIN, MINN.—A new university building, to replace that burned down, will be built, at a cost of $100,000.

JOLIET. ILL.—High School, br and st; cost $40.000; o, Joliet; a, Geo. O. Garnsey; b, E. Smith & Co.—G. M. Rose has prepared plans for a new wire mill for Lambert & Bishop.

KANSAS CITY, MO.—Stone front stores; cost $40,000; o, Wm. Williamson; a, Geo. O. Garnsey; b, not decided.

LAKE VIEW, ILL.—S. P. Saxe has plans for residence at Diversy and Halsted streets, of brick and cut stone, for Chas. L. Lindeman, cost $6,000, on Grace st. and Evanston ave. six dwellings.... S. E. cor. Lincoln ave., drug store for F. J. Kruell, and a number of others at from $5,000 to $25,000, each in the lake shore disrtict.

LAKETON, IND.—Woolen mills are to be erected by Eastern capitalists.

MIDDLEBURY, VT.—A town house will be built, to cost $11,500. Smith & Allen have the contract to build the court house for $18,000.

NEW YORK.—Booth's Theatre, at Sixth avenue and 23d street, has been sold to Mr. J. D. Fish, President of the Marine Bank, for about $550,000. Plans and estimates have been made for converting the theatre into a commercial building.

OGDENSBURG.—Washington st, dwell; cost $6,000; o, J. W. Wilson, a, J. P. Johnston; b, not let.

OCEAN BEACH, N. J.—Eben C. Jayne, Esq. of Phila. Pa., proposes to erect two cottages, 40x60 feet; Benj. Linfoot, architect, Phila.

OAK PARK, ILL.—Fr house; cost, $5,000; o, T. S. Rattle; a, Geo. O. Garnsey; b, not decided.

PHILADELPHIA.—John M. Sharp has broken ground for the erection of 101 houses at 24th and Master streets, cost about $200,800, also 13 dwellings on N. E. corner of 15th and Mount Vernon streets. Cost, including the ground, $210,000.

STAMFORD, CONN.—New Presbyterian Church will, cost $60,000; of brick and stone.

SAVANNAH, GA.—Catholic Orphanage, on e. s. Lincoln street, opposite Cann, approaches completion. Plans were drawn by Philip W. Dwyer, assisted by J. J. Nevitt.

STILLWATER, N. J.—M. F. Cummings of Troy, furnishes plans for a new school house....The German Catholics will build a church the coming season, to cost $26,000.

SPRING LAKE, N. J.—Presbyterian Church, 40x60 feet; to be built of stone, frame and tile; seat 600. Benj. Linfoot, architect, Phila.

SALT LAKE CITY.—Nothing to report this week, but prospects for the coming summer are good.

TOPEKA, KANSAS.—B. W. S. Clark is the architect for a dwelling to cost $10,000.

WINONA, MINN.—Ten capitalists propose to build an opera house costing $50,000.

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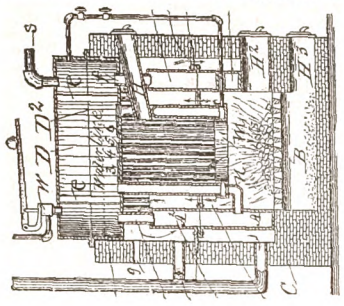
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

265,945. BOILER-FURNACE. JOHN COLLIS, Des Moines, Iowa. Filed Feb. 16, 1882. Issued Oct. 17, 1882. (No model.)

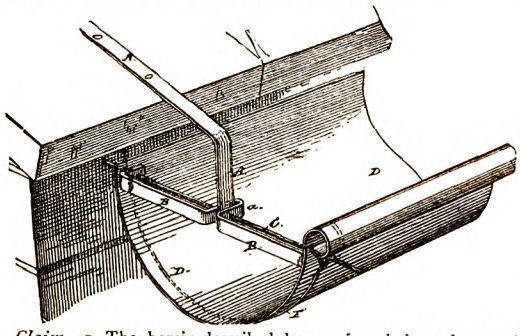


Claim.—1. In a boiler-furnace, the combination of a double-walled fire-box and vertical boiler-section having a skeleton top, a horizontal boiler section and dome, an outer wall or jacket, and an annular plate having an opening to allow the downward passage of the products of combustion, substantially as shown and described, for the purposes specified.

2. The improved boiler-furnace and steam-generator, composed of the double-walled fire-box and boiler-section A A² *f*, a grate B, a surrounding wall C, having a series of ports *g*, a crown-plate and boiler-section, D D² an annulus J, having an opening *k*, a fuel-magazine 3 4 5 6 *m*, having connecting branches *n* at its base, and a chute for conveying fuel to the fuel-chamber, substantially as shown and discribed, to operate in the manner set forth, for the purposes specified.

265,981. EAVES-TROUGH HANGER. CHAS. L. PIERPONT, Red Wing, Minn. Filed June 30, 1882. (No model.) Issued Oct. 17, 1882.

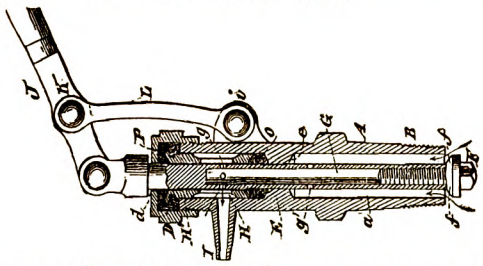
Brief.—The lower end of the attaching strap is inserted in the bend of the cross strap and held by a wire passing through both, to the ends of which wire the supporting wire is secured.



Claim.—1. The herein-described hanger, consisting of strap A, cross strip B, having bend *a* and ears *b*, and wire C, all combined and operating as set forth.

2. In combination with trough D, the hanger consisting of strap A, cross strip B, having bend *a* and ears *b*, wire C, and supporting wire E, applied as shown.

265,992. STEAM GAGE COCK. MARQUIS D. L. SWANK, Jasper T. Thornley and John A. Awalt, Anderson, Ind. Filed Jan. 27, 1882. (No model.) Issued Oct. 17, 1882.

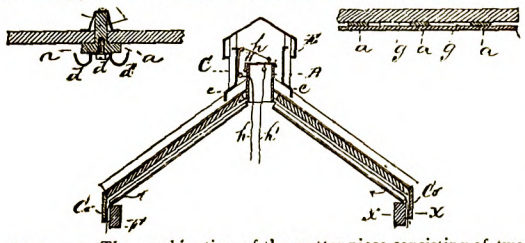


Claim.—1. The valve F, stem G, having apertures *g g*¹, and uncoupling-connections, combined with the casing A, having collar E with seat *e*, gland H¹, having annular recess H, the exit I, and operating means J L, as and for the purposes set forth.

2. The combination of the case A B C, having tube *a*, drip chamber N, and packing chambers O P, the exit I, and internal annular collar E, combined with the valve F, stem G, having ports *g g*¹, the gland H¹, having annular recess H, the cap-nut D, the separable lever J, and link L, all as and for the purposes specified.

266,015. SKYLIGHT AND VENTILATOR. WM. CONOLLY, New York, assignor to himself and John Seton, Brooklyn, N. Y., Filed Feb. 23, 1882. (No model.) Issued Oct. 17, 1882.

Brief.—T-bars of rolled iron, with sheet metal gutter portions attached below, are offset at the lower ends to fit the curb. The ridge piece is open from end to end and is covered by a damper, which overhangs, the whole being inclosed in a ventilating hood.



Claim.—1. The combination of the gutter piece consisting of two gutter portions and the interposed attaching portion secured to the lower portion of the T-bar, as specified and set forth.

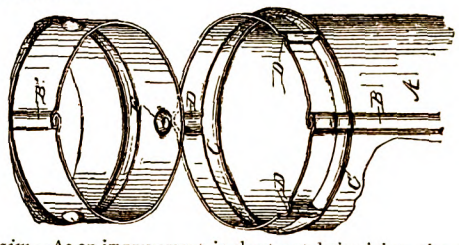
2. The combination of the gutter piece consisting of two gutter portions and interposed attaching portion secured to the lower portion of the T-bar, and the covering cap attached to the ridge of the bar, as specified and set forth.

3. The combination of the ridge piece having an opening through it, the inclosing box and cap, and damper arranged to overhang the ridge piece, substantially as specified.

4. The combination, substantially as specified, of the rafters provided with an extension at one end of the flanges, bent at an angle to the body of the rafter, with the base-plate and curb.

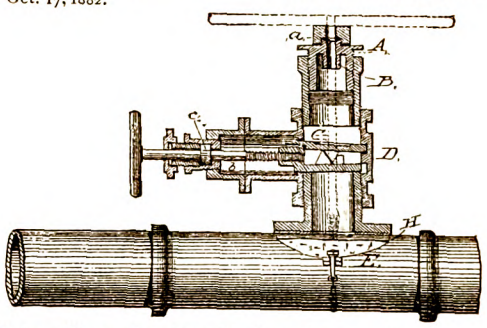
5. The combination, substantially as specified, of the rafters provided with an extension at one end of the flanges, bent at an angle to the body of the rafter, with the base plate and curb, and with the gutters of the rafter.

266,017. SHEET METAL PIPE JOINT. JOHN Y. COOPER, Nashville, Tenn. Filed Aug. 11, 1882. (No model.) Issued Oct. 17. 1882.



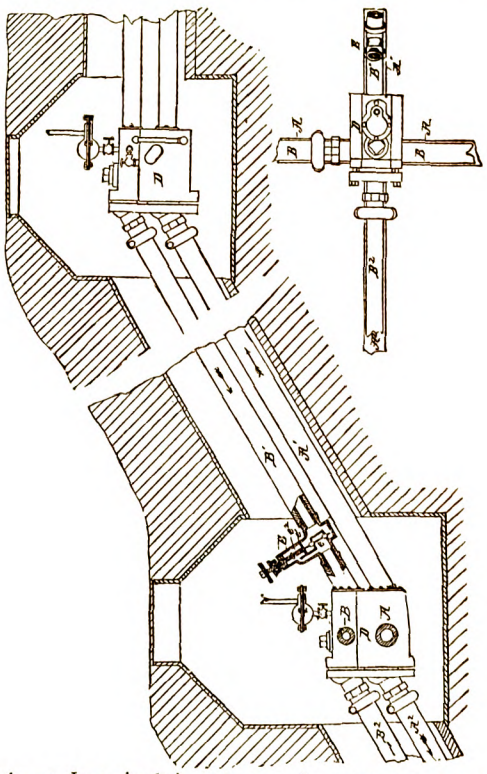
Claim.—As an improvement in sheet metal pipe joints, the combination of two sections of pipe, one provided with a groove to receive projections on the other pipe, which projections will be entirely hidden from view when the pipes are adjusted together, and will lock the pipes from disengagement by force exerted longitudinally in either direction, said sections of pipe each having a seam arranged to tally with the seam of the adjoining section when the entirely hidden projections are at the point where they can be separated from the grooves, the sections being capable of complete revolution on each other to bring said seams together, all arranged and operating substantially as shown and specified.

266,026. DEVICE FOR TAPPING MAINS. GEO. RICHARDSON, Bridgeport, Conn. Filed Apr. 8, 1882. (No model.) Issued Oct. 17, 1882.



Claim.—The combination, with the cylinder or valve chamber, of the hollow screw cap A, having the drill guide B, projecting both above and below the top plate, and the nut *a* fitted on the screw-threaded upper projection of said guide, substantially as set forth.

266,046. STEAM HEAT AND POWER DISTRIBUTING APPARATUS. EUGENE F. OSBORNE, St. Paul, Minn. Filed Dec. 19, 1882. Renewed Sept. 14, 1882. (No model.) Issued Oct. 17, 1882.



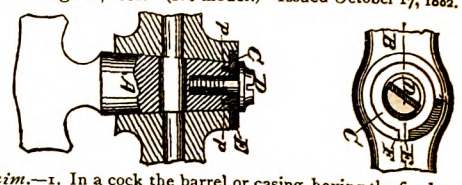
Claim.—1. In a circulating steam supply system returning the water of condensation to the generator and extending to districts of unequal elevation, the combination, with the condense water return pipe, of automatic mechanism, substantially as described, for controlling the flow of water therein in opposition to the force of gravity due to the difference in elevation, substantially as set forth.

2. In combination with a pipe giving descent to the water of condensation in a steam supply circulation, the pressure regulator valve E, arranged in said pipe near the point of normal pressure, substantially as and for the purpose specified.

3. In combination with a condense water return pipe giving ascent to the water of condensation in a steam supply circulation, and with an adjacent steam supply pipe, a pump automatically operated by steam from said supply and connected to force the water upward in the return pipe, substantially as set forth.

4. In combination with the steam supply pipe having a reducing valve, E¹, and the adjacent water return pipe, disconnected at P at a low point thereof, a steam pump S, having its steam supply *s*, provided with an automatic valve S⁴, connected to open by the pressure of water in the return pipe below the point of disconnection, and its steam exhaust connected into the steam supply pipe beyond the valve E¹, having its water cylinder connected to receive from the return pipe below and to deliver into the same above its point of disconnection, substantially as described, and for the purposes set forth.

266,182. COCK. CHARLES H. GOODRICH, Stoneham, Mass. Filed Aug. 10, 1882. (No model.) Issued October 17, 1882.



Claim.—1. In a cock the barrel or casing having the fixed member of the plug-arresting stop, combined with the washer attached, as usual, to the plug, and serving to connect the latter to the barrel, and provided with the stud E or its equivalent, whereby said washer is enabled to serve as the movable member of said stop in addition to its usual function as set forth.

2. In a cock, the combination of a cylindrical plug, the barrel having the fixed member, of the top and the detachable washer having the movable member of the stop, and pins *p p*, entering orifices in the end of the plug, whereby independent movement of the washer is prevented, as set forth.

265,786. APPARATUS FOR THE ELECTRICAL TRANSMISSION OF POWER. THOMAS A. EDISON Menlo Park, N. J. Filed Aug. 7, 1882. Issued Oct. 10, 1882. (No model.)

265,790. ELECTRIC LAMP. MOSES G. FARMER, Newport, R. I., assignor to the United States Electric Lighting Company, New York, N. Y. Filed March 7, 1881. Issued October 10, 1882. (No model.)

265,792. PROCESS OF AND APPARATUS FOR MANUFACTURING GAS. THOMAS B. FOGARTY, Brooklyn, N. Y. Filed Mar. 14, 1882. Issued Oct. 10, 1882. (No model.)

265,793. PROCESS OF MANUFACTURING GAS. THOMAS B. FOGARTY, Brooklyn, N. Y. Filed Mar. 29, 1882. Issued Oct. 10, 1882. (No model.)

265,794. STEAM BOILER FURNACE. MICHAEL A. FOSTER, St. Louis, Mo. Filed June 29, 1882. Issued Oct. 10, 1882. (No model.)

265,834. FIRE-PLACE FRAME. JOHN J. LEBEAU and CHARLES L. SHANNON, Cincinnati, Ohio, assignor to the Eureka Co-Operative Foundry Association, same place. Filed June 21, 1882. Issued Oct. 10, 1882. (No model.)

265,870. HIGH AND LOW STEAM AND WATER ALARM. JOSEPH RICHTER, Cincinnati, Ohio. Filed July 31, 1882. Issued Oct. 10, 1882. (No model.)

265,871. WATER GRATE-BAR. MATTHEW L. RITCHIE, New York, N. Y., assignor to John B. Kitching, same place. Filed May 31, 1882. Issued Oct. 10, 1882. (No model.)

265,915. PROCESS OF AND APPARATUS FOR MANUFACTURING HYDROGEN GAS. WILLIAM H. BRADLEY, New York, N. Y. Filed Sept. 9, 1882. Issued Oct. 10, 1882. (No model.)

265,928. HYDROCARBON-BURNER FOR ILLUMINATING PURPOSES. RICHARD MCALLISTER, Washington, D. C. Filed Aug. 21, 1882. Issued Oct. 10, 1882. (No model.)

265,961. COMPOUND FOR FIRE BRICK, FURNACE LININGS, ETC. JAMES HENDERSON, Bellefont, Pa., assignor to Chas. G. Francklyn, New York, N. Y. Filed Apr. 6, 1882. (No specimens.) Issued Oct. 17, 1882.

265,982. STOVE PIPE DAMPER. WM. E. QUIGGLE, Dedham, Mass. Filed Aug. 21, 1882. (No model.) Issued Oct. 17, 1882.

266,010. BRICK FOR BUILDING ARCHES AND FURNACE ROOFS. WM. G. BELL, Allegheny City, Pa. Filed Mar. 30, 1882. (No model.) Issued Oct. 17, 1882.

266,014. VAPOR BURNER. FRANK M. CAMPBELL, St. Louis, Mo. Filed Apr. 7, 1882. (No model.) Issued Oct. 17, 1882.

266,019. ROTARY PUMP. WM. N. DE GROAT, Knoxville, Tenn., assignor of one-half to A. L. Maxwell, same place. Filed Oct. 21, 1881. (No model.) Issued Oct. 17, 1882.

266,026. STEAM PUMPING ENGINE. WM. M. FERRY, Park City, Utah. Filed Mar. 29, 1882. (No model.) Issued Oct. 17, 1882.

266,078. STEAM GENERATOR. WILLIAM BEESLEY and James Beesley, Barrow-in-Furness, County of Lancaster, England. Filed June 7, 1882. (No model.) Patented in England May 2, 1882, No. 2,074; in France June 27, 1882, and in Belgium June 27, 1882, No. 58,319. Issued October 17, 1882.

266,117. PUMP. JOSEPH P. ELLACOTT, Chicago, Ill., assignor to the Union Brass Manufacturing Company. Same place. Filed June 25, 1881. (No model.) Issued October 17, 1882.

266,143. COMPOUND FOR FURNACE LININGS AND FIRE BRICK. JAMES HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Sept. 4, 1882. (No specimens.) Issued October 17, 1882.

266,144. MANUFACTURE OF COMPOUNDS FOR FURNACE LININGS AND FIRE BRICK. JAMES HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Sept. 4, 1882. (No specimens.) Issued Oct. 17, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING FEBRUARY 3, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	13	19 2	2	15.3			5	1	1	1	1	1	1	1					1			
Boston.....Mass	407,581	189	23.9	68	35.9	9		30	4	7	10	3	3		4	12		8			2		
Cambridge.....Mass	57,432	16	14 0	8	50.0			3	1		1				1		1	2					
Worcester.....Mass	64,995	30	24 0	11	36.6	1		5	2	1	1				1	4		2					
New Haven.....Conn	66,979	26	20.2	12	46.1			5						1		8	2	2					1
Providence.....R. I.	114,723	31	14 0	11	35.4	1	1	5			1	1	1			2				1	1		
Total	746,229	305	21 2	112	36.7	11	1	53	8	9	14	5	5	2	7	26	3	14		2	3		1
EASTERN CITIES.																							
Albany.....New York	98,430	48	25.3	23	47.9			3	4		2	1	1		2	7				2	1		
New York.....New York	1,299,249	618	24.7	206	33.3	25	7	119	10	6	20	4	4	9	14	71		25		15	6	1	9
Brooklyn.....New York	633,763	259	21.2	105	40.5	8		31	8	2	8	2		4	18	29	4	11		1	3		3
Hudson Co.....New Jersey	228,025	86	19.6	35	40.6	1		10	4		5			2	3	9		3					
Newark.....New Jersey	147,744	75	26 4	24	32.0	1	3	14				1	1	2	4	10		2			3		2
Camden.....New Jersey																							
Philadelphia.....Pa.	907,043	371	21.3	132	35.5	7		52	8		13	3	8		8	34	9	16				7	1
Reading.....Pa.																							
Wilmington.....Delaware	46,889	17	18 8	8	47.0		1								2						1	6	
Total	3,361,143	1,474	22.8	533	34.8	42	11	229	34	8	48	11	14	17	51	160	13	57		18	14	14	15
LAKE CITIES.																							
Buffalo.....New York	168,702	64	19.2	17	26.5	2	1	4	2		6	2	2		6	6							
Rochester.....New York	92,116	32	17.7	10	31.2	1		4		1	1	1		1	1	1		2	1				
Syracuse.....New York	54,696	18	17.1	6	33.3	1	5	1				1				2	1	1					
Cleveland.....Ohio	192,084	63	17.0					2	4		7				1	5	3	1	1	1	1		1
Detroit.....Michigan	131,118	48	18.7	23	47.9		1	3	8	1	5				4		2	1					
Chicago.....Illinois	597,834	206	17.9	98	47.5	4	3	17	8	1	8		3	1	6	18	6	10		1	4	4	1
Milwaukee.....Wisconsin	135,233	41	15.7	25	60.9		2		2		2				2	2	2						
Total	1,371,783	472	17.9	179	37.9	8	12	31	24	3	29	4	5	2	20	34	14	15	2	2	5	4	2
RIVER CITIES.																							
Allegheny.....Pa	89,038	47	27.4	16	34.0		1	6	2	1	2		2			2	6	3			1		1
Pittsburgh.....Pa	191,523	60	16.3	20	33.3	5		6			4		4			6	2	6	1	1			3
Cincinnati.....Ohio	267,767	119	23.1	41	34.4	1		16	1	2	4	1	3		5	15	5	6		1	3		2
Dayton.....Ohio																							
Louisville.....Ky	131,529	65	25.7	19	29 2	3	1	15								6		2			1	6	1
Indianapolis.....Indiana	86,529	24	14.4	5	20.8	1	1	5	1	1	1	1	1	1	1	3		1		1	1	1	1
Terre Haute.....Indiana	30,464	3	5.1	1	33.3	1																	1
Minneapolis.....Minn	98,026	15	7.8	4	26.6	1	2	2	1				3									1	1
St. Paul.....Minn																							
St. Louis.....Mo	362,816	190	27 2	72	37.8	8	2	18	5	3	7			2	15	28		10			3		1
Total	1,257,692	523	21.6	178	14.9	20	7	68	10	7	18	2	13	3	21	60	13	28	1	3	9	8	11
PACIFIC CITIES.																							
San Francisco.....Cal.....(Feb. 3d)	270,325	102	19.6	27	26.4	5		22		5	2	1	3	1		13	2	6			1		
SOUTHERN CITIES.																							
District of Columbia.....Wh.	136,471	44	16.7	11	25.0			4	1	1	1				2	4	1					1	
" " .....Col.	71,103	42	30.7	19	45 2	1		8					1	2	1	5		2	1				
Richmond, Va.....Wh.	38,526	10	13.4	2	20.0	1		2								3							
" " .....Col.	29,394	18	31.7	8	44.4		1	4								3	1						1
Charleston, S. C.....Wh.	22,699	7	16.0	2	28.5								1					1					
" .....Col.	27,595	16	31.1	9	56.2			2								2	2	1					
Atlanta, Ga.....Wh.	25,583	11	22.2	4	36.3			2								1						1	
" .....Col.	19,221	6	16.2	4	66.6											1							
Savannah, Ga.....Wh.	15,041	8	27.6				2																
" .....Col.	16,506	12	37.8					1								4							
Nashville, Tenn.....Wh.	31,993	12	19.5	6	50 0	1		2		2								1		2			
" .....Col.	19,406	9	23.9	1	11.1		1	3	1												1	1	
Memphis, Tenn.....Wh.	18,677	12	33.3	2	16 6		2	2						1		1					1		
" .....Col.	14,806	12	41.9	7	58.3			1								1							
Mobile, Ala.....Wh.	16,927	5	15.3					3				1						1					
" .....Col.	14,368	4	14.4	1	25 0	1		1	1											1			
New Orleans, La.....Wh.	163,757	93	29.5	11	11.8	2		15		3	2		1	4		7					1	13	
" " .....Col.	59,866	57	49.5	15	26.3	1		5		2			1	7		4		1				18	
Total White	469,674	202	22.4	38	18.8	4	4	30	1	6	3	1	2	5	2	16	1	3		2	2	15	
Total Colored	272,355	176	33.6	54	30.6	3	2	25	2	2			2	9	1	21	3	4	1	1	1	19	1
Total in 37 U. S. Cities	7,749,201	3,254	21.3	1,121	34.4	93	37	390	79	40	114	24	44	39	102	330	49	127	4	28	35	60	30
Total for 4 weeks, ending Jan. 27	6,814,270	11,595	21.8	3,979	34.3	319	86	1,735	311	122	570	72	248	82	391	1,139	97	441	27	97	133	92	83
" 27,—Total in 28 English Cities	8,620,975	3,703	22.4			124				37	36				87					52		11	129
" 20, " 16 Irish Cities	854,731	439	26.7			6		47		16			3		4		117			5			19
" 27, " 8 Scotch Cities	1,233,088	648	27.3			11				14	19		10		15		176			8			52

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of the journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the mid-of the sixth half-year from the date of the taking of last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only mars the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending February 10, of an urban population of 7,749,201 there died 3,254 which is equivalent to an annual death rate of 21.3 per 1,000, a slight decrease from the preceding week for which it was 21.7.

For the North Atlantic cities the death rate was 21.2; for the Eastern cities 22.8; for the Lake cities 17.9; for the river cities 21.6, and for the Southern cities, whites 22.4, colored 33.6 per 1,000.

For the four weeks ending January 27 the mortality rate for an average urban population of 6,814,270 was 21.8 per 1,000, a slight increase over the two preceding months. During this period of four weeks the average death rate in North Atlantic cities was 21.3, in the Eastern cities 23.4, in the Lake cities 18.2 in the river cities 19.7, in the Southern cities, for the whites 19.2 and for the colored 31.7 per 1,000. These figures may be compared with those for the months of November and December given in the Notes on page 133 of THE SANITARY ENGINEER for Jan. 11, 1883.

BOSTON, MASS.—C. E. Davis, Jr., reports 31 cases of diphtheria 20 of scarlet fever and ten of typhoid fever.

NEW YORK CITY.—The case of death from small-pox given in the table is reported by Dr. John T. Nagle as having arrived by schooner Archer and Reeves from Baltimore, Md., and died at Riverside Hospital Feb. 2.

NEW YORK CITY LUNATIC ASYLUM.—Dr. Franklin reports seven admissions, three discharges, four deaths and 1,325 remaining under treatment.

MILWAUKEE, WIS.—Dr. Diercks reports seven new cases of diphtheria and 15 of scarlet fever.

LOUISVILLE, KY.—Dr. Montgomery reports small-pox as "quite prevalent," but gives no estimate of the cases. Six deaths were reported from this cause during the week.

RAVENNA, PORTAGE CO., OHIO.—Scarlet fever continues to prevail in the town.

WHEELING, W VA.—Dr T. O. Edwards reports two cases of small-pox introduced into the city from Baltimore, Md.

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DALLAS, TEXAS,—One case of small-pox proved fatal on Jan. 31. The health officer reports on Feb. 8 that there have been no other cases reported.

MOLINE, ILL.—Dr. L. D. Dunn reports four cases of small-pox as having been sent to hospital during the week.

YONKERS, N. Y.—Dr. V. Browne, Health Officer, reports four cases of diphtheria as having occurred during the week.

PITTSBURGH, PA.—Dr. Snively reports three cases of small-pox for the week ending Feb. 10.

SAN FRANCISCO, CAL.—Dr. J. Hoesch, Sec'y of Health Board, reports 115 deaths for the week ending Jan. 26, of which number 27 were in persons under five years. Accidents two, consumption 25, diarrhœa seven, diphtheria five, pneumonia 13, congestion of lungs two, bronchitis six and whooping cough one.

The report for the week ending Feb. 3, is given in the table above.

CHICAGO, ILL.—Dr. W. K. Gleason's report for the week ending Feb. 3 was not received in time for publication last week. Total mortality 232; under five years 97. Accidents ten, cerebro-spinal meningitis four, consumption 36, croup seven, diphtheria 21, erysipelas one, typhoid four, malaria fever three, scarlet fever six, pneumonia 16, congestion of lungs four, bronchitis 17, measles one, puerperal diseases six and small-pox four.

PROVIDENCE, R. I.—Dr. E. M. Snow reports the census taken Jan. 1, 1883 as giving the city a population of 116.755; males 55,736, females 61,019; families 25,977. The increase since 1875 is 16,080 or 15.97 per cent; since 1880 the increase is 11,898 or 11.34 per cent.

MICHIGAN.—Dr. H. B. Baker reports the following diseases in their order of prevalence as the principal causes of sickness during the week ending Feb. 3: neuralgia, bronchitis, rheumatism, consumption, intermittent fever, tonsilitis, pneumonia and influenza.

Diphtheria was reported present at 19 places, scarlet fever at 18 places, and measles at 17 places. Small-pox was reported at St. Joseph, Berrien Co., Feb. 3.

JACKSONVILLE, FLA.—Dr. A. W. Knight reports influenza as the prevailing sickness of the month of January, caused by unusually wet and cold weather. The large rainfall made it impossible to have the streets kept in their usual clean condition. The cleaning out of the mouth of a drainage creek in the city is urged as a preventive of malarial disease.

ONTARIO, CANADA.—The *Provencial Bulletin*, for the week ending Feb. 3, shows an increase in the diseases of the respiratory organs, which is believed to be largely due to the extreme weather of the previous week. Bronchitis, influenza, neuralgia, pneumonia, and rheumatism increased in degree of prevalence and tonsilitis in its area of prevalence. Diarrhœas continue. Diphtheria, which in November and December prevailed in the western district, is now prominent in other parts of the province. Small-pox is reported epidemic among gangs of railway men in the far North.

HAVANA, CUBA.—Dr. D. M. Burgess reports 551 deaths for the month of January. Yellow fever caused 14 of these deaths, typhoid fever eight, and diphtheria and croup five each. Four of the fatal cases of yellow fever occurred among private citizens, the remaining ten among soldiers and sailors in the military hospital.

During the first seven days of February one fatal case of yellow fever and one of small-pox were recorded.

AUX CAYES, HAITI.—Consular Agent Dutton reports for the weeks ending Jan. 6 and 13, small-pox is decreasing. There were five deaths caused by it in the former week and only two in the latter.

ST. THOMAS, DANISH WEST INDIES.—The report for the fourth quarter of 1882 shows 91 deaths, or 24.26 per 1,000 living per year. 30 deaths of children under five years are recorded. Typhoid and typhus fevers, pneumonia, puerperal fever, and violence caused each one death; bronchitis nine, consumption 13, diphtheria four, and diarrhœa nine. During the quarter the following cases were reported by the medical men: Small-pox, scarlet fever, croup, whooping cough, and erysipelas, none; measles two, diphtheria nine, typhoid fever two, dysentery 33, diarrhœa 96, puerperal fever one, malarial fever 128, catarrhs and bronchitis 46.

The Report for the year 1882 shows 480 deaths in the population of 15,000, giving a rate of 32 per 1,000. Deaths under five years, 181; births, 406, including 33 still-born. Of the 480 deaths one was caused by yellow fever (at quarantine), four by malarial fevers, four by typhoid and one by typhus fevers, 20 by measles, three by erysipelas, five by diphtheria, two by croup, 49 by bronchitis (acute), 58 by consumption, seven by pneumonia, two by pleurisy, one by puerperal fever, four by dysentery, 73 by acute diarrhœa, and six by violence.

Two cases of small-pox were introduced during the year, were quarantined, and did not spread. Measles were introduced by a French steamer with emigrants from Teneriff, and 164 cases were recorded, but these reports of cases by no means indicate the real prevalence of the sickness; thus, in one week, during which 16 cases were reported, the school director found 65 children absent on account of this disease.

PERNAMBUCO, BRAZIL.—Consul H. L. Atherton sends reports for the weeks ending December 25 and January 1, 8 and 15. Population 109,300. First week: total mortality 55; from small-pox nine. Second week: total mortality 53, of which eight deaths were caused by small-pox and one by yellow fever. Third week: total mortality 60; small-pox ten, yellow fever one. Fourth week: total mortality 51; small-pox ten, yellow fever none.

RIO DE JANEIRO, BRAZIL.—Deputy Consul-General Jas. H. Murray reports 225 deaths during the week ending December 30. Of these 32 were caused by small-pox, five by pernicious fever and 37 by consumption. Population 330,000.

TEHUANTEPEC, MEXICO.—Consul Jno. A. Sutter, Jr., of Acapulco, transmits an extract from a letter of January 2, from the Consular Agent at Tehuantepec which states that an epidemic of diarrhœal disease, introduced by troops from Tomala, has killed more than one thousand persons in about four weeks, but is now happily decreasing.

SCOTLAND.—The return of the Registrar-General for the week ending January 27 shows the death-rate in the eight principal towns of Scotland to have been 27.3 per 1,000, or 4.7 above that for the corresponding week of last year. The lowest mortality was recorded in Leith, 14.4; the highest in Dundee, viz., 33.8; in Edinburgh the mortality was 21.2. Whooping cough continues to be the most fatal miasmatic disease, the mortality from it being greatest in Dundee and Glasgow (20 fatal cases in each).

IRELAND.—Consul A. B. Wood, of Belfast, transmits the report of the Registrar-General for the week ending January 20, an abstract of which appears in our table.

In the Dublin District there were 165 deaths equalling an annual rate of 24.5. No deaths occurred from small-pox, measles, scarlet fever or diphtheria. Five deaths were registered from typhus and 11 from whooping cough.

In Belfast there were 145 deaths making a rate of 27.7. No deaths occurred from small-pox or diphtheria. Measles caused two deaths, typhus one, scarlet fever three and whooping cough five.

The Registrar-General's return for the quarter (13 weeks) ending December 30, 1882, shows an average annual death-rate of 27.5 in the Dublin Registration District and fifteen of the principal Urban Sanitary Districts of Ireland. Clonmel gave the lowest rate 15.4 and Wexford the highest 44.7

In Dublin the rate was 25.9; and of the total number, 2,258, of deaths two were caused by measles, four by scarlet fever, 23 by typhus, 50 by whooping cough, nine by diphtheria, 45 by enteric fever, 48 by diarrhœa and dysentery, 249 by consumption and 587 by diseases of the respiratory organs.

In Belfast the rate was 31.2 and the total deaths 1,620. Small-pox caused five deaths, measles 73, scarlet fever 135, typhus 14, whooping cough 29, diphtheria nine, enteric fever, diarrhœal diseases 52, consumption 187 and diseases of the respiratory system 455.

Measles caused high death-rates in Dundalk and Wexford.

PARIS, FRANCE.—The Bulletin for the week ending Jan. 25 records 1,112 deaths; males 614, females 498; under five years, 271, over 60 years, 262. Typhoid fever caused 56 deaths, small-pox 14, measles 11, scarlet fever two, whooping-cough seven, croup and diphtheria 42, erysipelas eight, consumption 216, acute bronchitis 41, pneumonia 79, and violence 25. Annual rate 25.80. On Jan. 21 there remained under treatment in the hospitals 66 cases of small-pox, 624 of typhoid fever, and 32 of diphtheria.

The night medical service of Paris is conducted by 658 physicians and 185 mid-wives. These were called 6,891 times during the past year; 2,476 times on account of sick men, 3,400 times on account of sick women, and 1,015 times on account of children. This service has been progressive. In 1876, the year of its establishmsnt, 3,616 visits were made, but the number rose in 1879 to 5,282, in 1880 to 6,341, and now in 1882 to 6,891.

RHEIMS, FRANCE.—Consul John L. Frisbie reports for the week ending Jan. 20, a total of 46 deaths, equalling an annual rate of 25.48 per 1000 living. The births numbered 70, not including three still-births. Diphtheria, measles, small-pox, typhoid fever and pneumonia caused one death each, acute bronchitis and bronchial catarrh six deaths, broncho-pneumonia two deaths, and consumption ten deaths.

LYONS, FRANCE.—Consul B. F. Peixotto reports 201 deaths during the week ending Jan. 13, which is equal to an annual rate of 27.7 as compared with an average of 24.8 during the previous five weeks. The increase is ascribed to catarrhal diseases.

MARSEILLES, FRANCE.—The monthly bulletin for December shows 973 deaths in a population of 360,99. Typhoid fever caused 47 deaths, malarial fever eight, measles 31, whooping cough two, scarlet fever one, small-pox 26, croup and diphtheria 40, consumption 116, bronchitis 23, pneumonia 149, pulmonary congestion nine, puerperal fever three and violence 18. Of the decedents 280 were under five years of age, and 252 were over sixty years. The births numbered 848. Small-pox, measles, typhoid fever and croup are reported as increasing in prevalence.

During the year 1882 there were 10,915 deaths; males 5,831, females 5,084, and 10,256 births, exclusive of 818 still-births.

BRUSSELS, BELGIUM.—During the week ending Jan. 20, 190 deaths occurred in the city and its *faubourgs* and 285 births, corresponding respectively to anuual rates of 36.2 and 24.3 per 1,000. Of the deaths 91 occurred in persons under five years of age. Small-pox caused three deaths, measles one, scarlet fever and diphtheria none, fevers (typhus and typhoid) three, croup two, whooping cough one, diarrhœal diseases 24, bronchitis and pneumonia 32 and consumption 29.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits report for the week ending Jan. 13. Total deaths 95, males 50, females 45 under five years 49, over sixty years 16. Annual rate 28.4. Violence caused four deaths, bronchitis eight, pneumonia 17, consumption 13, diarrhœal diseases five, typhoid fever one, croup two, scarlet fever six and measles, four. No deaths are reported from small-pox, whooping cough or puerperal fever.

During the week ending Jan. 20 the following cases were reported: measles 57, scarlet fever 30, puerperal fever one, erysipelas three, whooping cough 17, diphtheria eight, typhoid fever six, diarrhœa 24, tonsilitis 23, pneumonia 18, pleurisy one, and acute bronchitis 117.

COPENHAGEN, DENMARK.—During the week ending Jan. 16, there were 131 deaths, under five years 67, over sixty 33. Measles, typhoid fever, dysentery and puerperal fever caused one death each, scarlet fever and diphtheria two each, croup and whooping cough three each, consumption ten, pneumonia nine and bronchitis 15.

During the same week the following cases were reported: Measles one, scarlet fever 30, diphtheria 17, croup three, whooping cough 62, typhoid fever four, diarrhœa 95, erysipelas 22, puerperal fever two, bronchial catarrh 554, pneumonia 53 and tonsilitis 134.

MADRAS, INDIA.—Consular Agent L. Strange, reports for the week ending Dec. 22. Total deaths 287, males 130, females 157. Annual rate 27.5. Small-pox caused five deaths, measles none, fevers 85, dysentery 29, diarrhœa 13, and cholera none.

BOMBAY, INDIA.—Consul B. F. Farnham reports that during the week ending Jan. 9, the deaths registered were 455, being 26 more than in the preceding week and 27 less than the mean of the corresponding period in the previous five years. There were 83 deaths from remittent fever, one from cholera, 79 from diseases of the respiratory system, 22 from diarhœa and 18 from dysentery.

COLUMBO, CEYLON.—Reports for the weeks ending December 16, 23, 30 and Jan. 6, show the cases of small-pox reported to have been respectively 24, 30, 24 and 37, and the deaths from this disease in the respective weeks one, two, six and six.

REGISTRATION OF BIRTHS, MARRIAGES, AND DEATHS.

To the Editor of THE SANITARY ENGINEER:

In your issue of Feb. 1 you say in your notice on the Second Annual Report of the State Board of Health, "With regard to the State system of registration of births, marriages and deaths, we are told that it is doing well, and that '947 towns, 326 incorporated villages, and 18 cities have been provided with methods of vital registration.' We should like to see a list of these towns, villages, and cities, a statement of the number of births, deaths, and marriages which they have recorded and reported, and also a list of those towns, villages, and cities which are not keeping such records." It is with pleasure that I notice such an indication of interest—which I hope is a growing one—which you evince in the matter of registration of births, marriages, and deaths.

The new law, though crude and deficient in many points, is, on the whole, a good measure, but it needs the proper officers and the people themselves to take an interest and help carry out this law. There is no use denying that this country is far behind other countries, and our State far behind other some States in this matter. The apathy and stolid indifference shown by physicians and clergymen, whose duty it is to make the returns, and the silly opposition exhibited by some individuals, who should see at a glance that it is for their own benefit, is little short of exasperating.

I would be greatly pleased to see the public prints take this matter in hand more than they do, publish the reports as they come out, keep the matter before the public mind, and urge their readers to see the necessity of not only complying with the law, but assisting in its fulfillment.

I need not here set forth the manifold benefits arising from an accurate and efficient system of registration, my time and your space would not permit, but the thinking mind will, I think, discern the numerous advantages, both of public and private import, to be derived from such a system.

Now, Mr. Editor, while thanking you for noticing the matter as above stated, may I make bold to ask you to continue doing so; and should any other of your readers be interested in this subject I should be only too glad to hear their views on it.

Yours truly, ELLIOT.

SUICIDES IN NEW YORK CITY DURING THE ELEVEN YEARS ENDING DECEMBER 31, 1880. By JOHN T. NAGLE, M.D., Cambridge, 1882. 15 pp., 8vo.

This interesting pamphlet is a reprint from the transactions of the American Public Health Association of a paper read before that body at Savannah in 1881. It appears that during the 11 years in question 1,521 deaths were registered in the Health Office as caused by suicide, 1,193 being of males and 328 of females; whites 1,518, colored three. It seems, however, that the register refers certain deaths to suicide which would certainly not be included under that head by most registers, since they were evidently accidental and not intentional.

The highest yearly rate of suicide in New York city during the past seventy-seven years was in 1805, when there was one suicide to every 3,017 inhabitants, and the lowest rate was in 1864, when there was one suicide to 23,827 inhabitants, Taking those races present in sufficiently large numbers to make the comparison of value, we find 626 suicides among the Germans, giving a rate of 34.49 per 100,000 for eleven years. The Irish furnish 213 cases, giving the rate of 9.71 per 100,000, and the United States 368, giving a rate of 5.61. Evidently the American is not so easily discouraged as the others.

The most common means used was poison, which is reported in 503 cases. Paris green was the poison most used, being the cause in 200 cases. Hanging was employed in 237 cases; cuts and stabs in 174; gun and pistol shot wounds in 395, and drowning in 99 cases. Tables are given comparing the rates in New York with those of other cities, both American and foreign, for the year 1880, but for the great majority the numbers are too small to have any statistical value. The smallest proportion of suicides is found in the Scotch cities taken altogether.

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Dr. Nagle remarks that "in order to prevent or decrease suicides by poison and fire arms it will be necessary to restrict the sale by imposing severe penalties. In regard to the other means used for committing suicide, remedial measures will easily suggest themselves." We must say that they do not suggest themselves to us, and we have been unable to find others more fortunate. If there are any such it is time the two hundred and forty odd cities whose statistics are given were making use of them.

Dr. Nagle's study is a very interesting one, especially to those interested in Sociology and Ethnology, and it is to be hoped that he will continue his studies and favor us with more of the same sort, for which he must have ample materials.

SURFACE TEMPERATURES IN PARIS.—Edmond and Henri Becquerel have presented to the French Academy their observations upon the temperatures of the air and earth during the year 1880. They find that at the upper surface of the ground, when covered with snow, the temperature was maintained almost constantly in the neighborhood of—1° C., and did not fall below—1.5°, although the temperature of the air, as well as that of the upper surface of the snow, varied from—15° to 0°. The diurnal variations of temperature at the surface of the soil were perceptible under a mass of snow of .25 metre thickness (9.84 inches), but they never exceed a few tenths of a degree; moreover, the differences in the observed temperatures, at different depths in the snow, varied nearly in proportion to the depth. These results show that a bed of snow, when the temperature is below 0° C., has a feeble conductivity and behaves like a conducting body traversed by a calorific wave. Under a surface which is covered by turf, the variations are much more feeble than under a surface of gravel or loam. The network of rootlets constitutes an almost complete non-conductor. Each bed of soil is submitted to the influence of two calorific effects; one due to the variations of external temperature, the other to the action of the deep layers which tend to produce a constant temperature. The amplitude of thermometric oscillation which results from these complex effects when there is any disturbing influence, such as an infiltration of water, varies inversely with the depth of the bed.—*Comptes Rendus.* C.

THE PHYSICIAN AND THE DRUGGIST.

About a year ago Martin McIntyre, a Fonda druggist, put up a prescription for John Cook, written by Dr. Parsons, of Fultonville. The medicine nearly killed Cook. The physician claimed the prescription had been altered and commenced an action against the druggist for damages. The prescription called for one dram of podophyllin. Dr. Parsons claimed he had written it one grain, and that it had been altered by the druggist, to cover up his mistake. The case was tried last week. On the trial McIntyre swore the prescription had not been altered, and Dr. Parsons swore it had. Two experts testified that no alteration had been made. Another question in the case was whether or not the druggist was justifiable in putting up a prescription in which he noticed a dangerous excess of any ingredient. Judge Landen ruled that if the prescription of a regular practicing physician is put up as written, the druggist is not responsible. The jury decided that the prescription had not been altered, and therefore no cause for action.—*Utica Herald.*

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EMPLOYMENT WANTED. P. 280.
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BARSTOW STOVE CO., New York. Crystal Fire-Place Heater. P. 281.
THOS. E. McNEIL, New York. Steam Heating. P. 282.
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Under this head we will insert advertisements, not exceeding four lines, free of charge, for persons seeking employment. This privilege is restricted to persons employed by *Architects, Civil Engineers, Chemists, Electric Light Companies, Gas Companies, Plumbers and those engaged in the business of Heating by Hot Air, Hot Water and Steam.*

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Proposals.

PRINCETON WATER WORKS.

OFFICE OF THE PRINCETON WATER COMPANY, PRINCETON, N. J., *Feb.* 10, 1883.

Proposals will be received at this office until noon of Tuesday, February 27, 1883, for the construction of a well, engine-house and boiler-house and chimney and for foundations for a tower, and for laying water pipes and appurtenances for the Princeton Water Company, in accordance with the plans and specifications for the same on file in this office. All proposals must be itemized in accordance with the plans and specifications for the same on file in this office. All proposals must be itemized in accondance with the classification prescribed by the Company, and no proposal for doing the work for a gross sum, irrespective of items, will be considered. The Company reserves the right to reject any or all proposals if they are not satisfactory. The plans and specifications may be seen and blank forms of proposals procured at this office, and also at the office of the engineer, J. J. R. Croes, C. E., 63 Bleecker street, New York City. Any person to whom a contract may be awarded will be required to execute a bond with satisfactory security for the amount of 50 per cent. of the estimated cost of the work. The work is to be begun at once, and completed by July 1, 1883.

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DEPOT QUARTERMASTER'S OFFICE, CORNER HOUSTON AND GREENE STS., NEW YORK CITY, *Feb.* 5, 1883.

Sealed proposals, in triplicate, with a copy of this advertisement attached to each, are invited, and will be received at this office until 12 M., March 7, 1883, at which time they will be opened in the presence of bidders, for the construction of a steam propeller for the United States Quartermaster's Department, for service at Fort Monroe, Virginia. Bids are invited to be made for the vessel complete; also for that portion embraced in specifications No. 1, or that in No. 2, or that in No. 3, only, or those portions in any two of them. Plans and specifications of the same, together with all other necessary information, will be furnished to bidders on application to the Chief Quartermaster on Governor's Island, New York Harbor, the Depot Quartermasters at Washington, Baltimore, Philadelphia and Boston, the Post Quartermaster at Fort Monroe, Virginia, and at this office. Bids are also invited for the work on the basis of supplying out-board condenser, 6-inch, No. 8 copper, or ¼ brass. Also on the basis of the Government supplying the circulating and air pump, and a condenser of one-half the required capacity, the contractor furnishing the other half and making all connections. In either case, if award is made thereon, the specifiations will be changed accordingly. The right is reserved, on the part of the United States, to reject any or all bids. Proposals should be endorsed "Proposals for Construction of Steam Propeller," and addressed to the undersigned.

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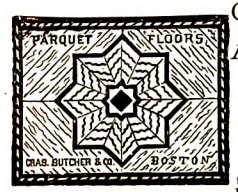

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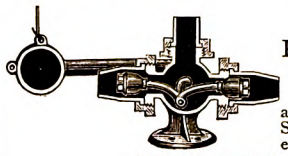

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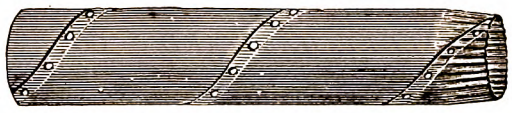

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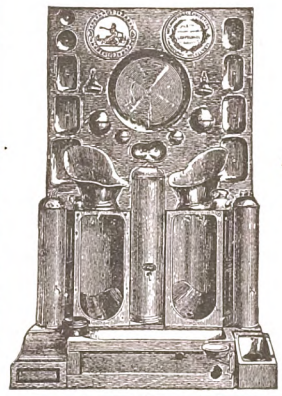

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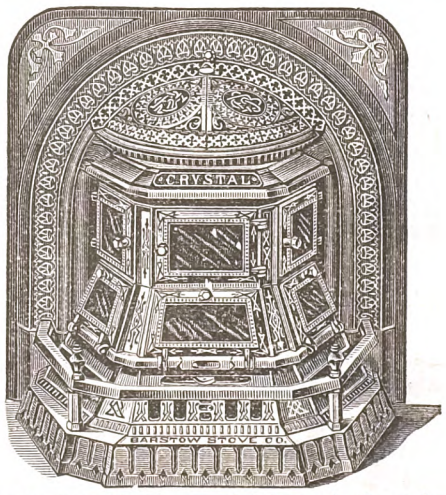

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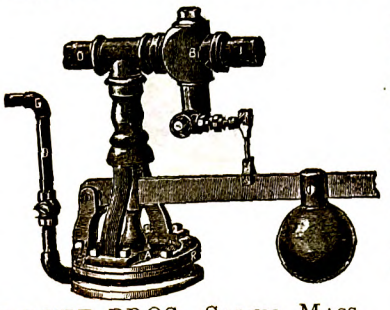
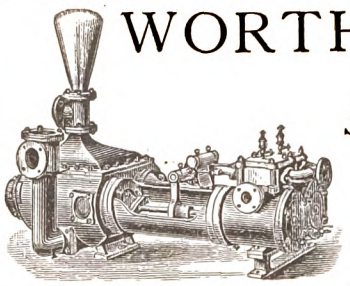
64 UNION ST., BOSTON.

Locke's Steam Pressure Regulator.



More than 1000 in use. Warranted the most accurate Regulator made for every situation where it is desired to keep a reduced, uniform pressure.
We challenge the world to match it.
LOCKE BROS., SALEM, MASS. Established 1870.



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FOR ALL PURPOSES AND OF ALL SIZES.
Special Patterns For Railway Water Stations, Hydraulic Elevators, House Tank Service, Boiler Feeding, etc.
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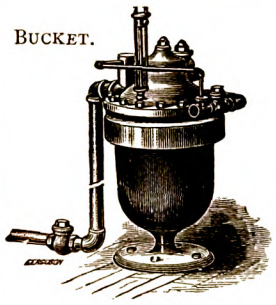
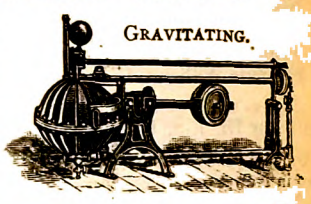
Sole Manufacturers of the Montgomery Patent Gauge, Cooler and Ball Cocks.
Agents for the Joel Hayden Brass Works, Lorain, O.

BUCKET.

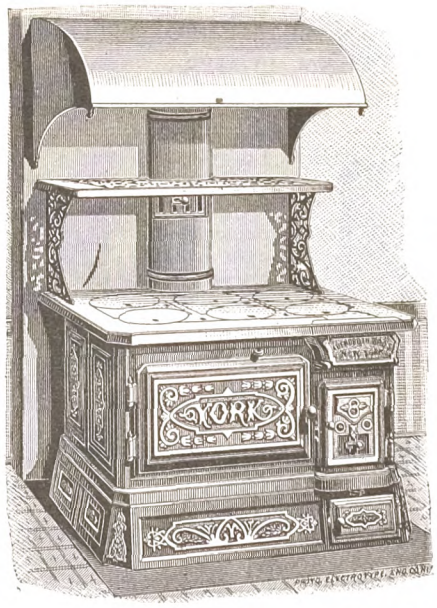


The Albany Steam Trap Co.'s
BUCKET AND GRAVITATING TRAPS.
Automatically drains the water of condensation from HEATING COILS, and returns it to the boiler, whether coils are *above or below* the water level in boiler, doing away with pumps and other mechanical devices for such purposes.
ALBANY STEAM TRAP CO., Albany, N. Y.

GRAVITATING.



TO ARCHITECTS, BUILDERS and OTHERS.



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This Range is made in four styles:—With BASE, with LOW WARMING CLOSET, with ELEVATED WARMING CLOSET, and with HOOD and WARMING SHELF.
Architects, Builders, and those interested are invited to call at our show rooms.

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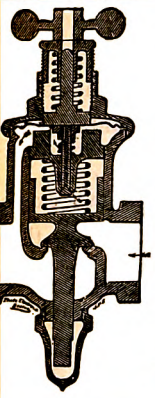

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Steam, Water and Air,
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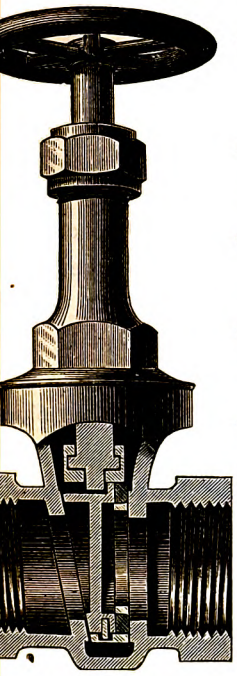
ENKINS' PATENT
(BRASS, AND IRON BODY BRASS MOUNTED,)
TE, GLOBE, ANGLE, HORIZONTAL, CHECK AND SAFETY VALVES.



The advantages these valves possess over all other gate valves, are—

1st. They do not depend on a metallic disc for a joint, but use the Jenkins' Compressible Packing.

2d. As the disc of packing wears, the inclined follower (or metal seat,) keeps the disc to its seat, making a perfect joint.

3d. Should the discs give out at any time, they can be replaced very quickly, and at a small cost.

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5th. When the valves are only partly open steam rushing through does not come in contact with the disc, so that it is impossible for the steam to wear holes through it or cut it out, as is too commonly the case with metal disc valves.

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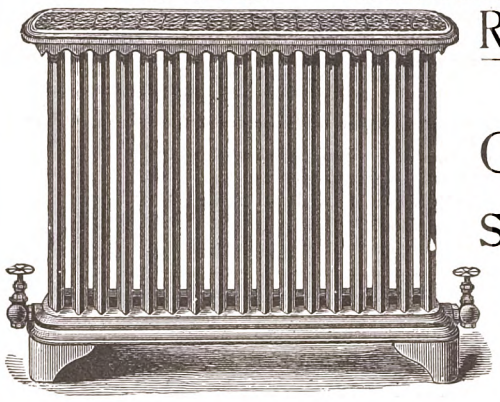

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For high and low pressure steam.
THE UNION STEAM & WATER HEATING APPARATUS,
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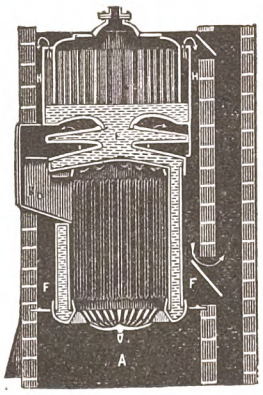
☞ *Estimates furnished on application.* ☜



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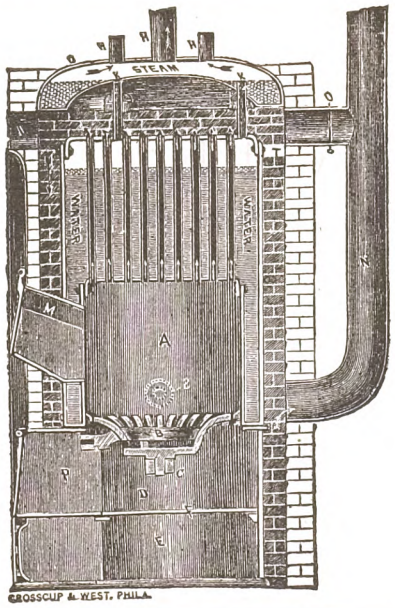

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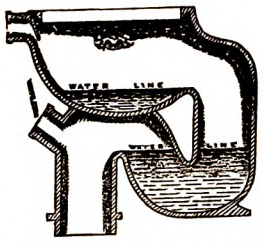
These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

For sale by all dealers in Plumbers' Supplies.

The "National" Patent Side Outlet Closet and Trap.

WITH IMPROVED FLUSH. (Registered).



Made either complete in one piece of Earthenware, or in two pieces with Basin and Trap separate.

An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin.

The Most Cleanly, Durable, Effective and Cheapest Closet and Trap ever used, requires no fittings nor Machinery of any kind, and cannot get out of order.

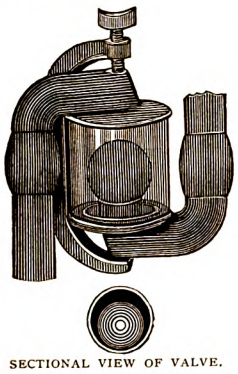
For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

MANUFACTURED BY THOS. TWYFORD, HANLEY, STAFFORDSHIRE, ENG.

Sole Agent for the Manufacturer, E. ASPINALL, 206 Pearl Street, New York.

PLUMBERS' AND SANITARY EARTHENWARE OF ALL DESCRIPTIONS.

Illustrated Catalogue and Prices Furnished the Trade on Application.



SECTIONAL VIEW OF VALVE.

BENNOR

Syphon Trap

Will recommend itself to

Architects, Plumbers and Sanitary Engineers.

Because; First—It is a perfect seal under all circumstances, with or without water.

Second—By the peculiar construction of the valve in connection with its syphoning force, the trap and adjoining pipes are kept clean and free of coating.

Third—It cannot become clogged.

Fourth—It is simple, durable, cheap and easily adjusted.

BENNOR SYPHON TRAP CO., LIMITED.

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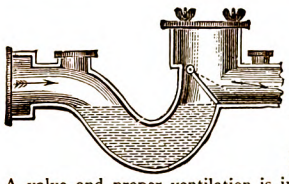


BEDELL'S

IMPROVED

IRON SEWER GAS

AND

BACK WATER TRAP

Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.

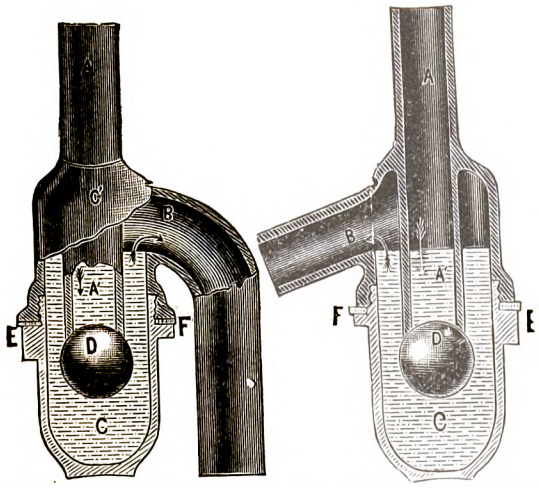
THE BOWER

SEWER GAS TRAP.

A Positive Valve Seal. A Sound Water Seal.

Simple, Cheap, Effective and Durable.

Under the severest tests to which a trap could be subjected by a commission appointed by the National Board of Health, and whose report was printed in full in THE SANITARY ENGINEER, it will be seen that the BOWER TRAP offered greater resistance to syphonage action than any trap manufactured for sale.



The Manufacturers solicit correspondence from the public, especially the Trade and Architects.

Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

B. P. BOWER & CO., Manufacturers, Cleveland, O.

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Manufacturers of

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With or without CREQUE'S PATENT CIRCULATION.

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Prior to that period it was little known, except to those Americans who may have seen them when traveling in Great Britain; while it is true that they had been used there for 25 years, and were universally conceded to be the finest thing in the way of a Bath Tub known, yet, like all things supposed to be new and of high cost, they required extensive advertising to secure their acceptance and use to any considerable extent in the United States.

The effect of numerous expressions of opinion, made without either knowledge or experience to justify them as to their durability and utility, had to be counteracted, yet, as a result, we have succeeded in having them selected for some of the most elegant residences that have been erected within the past ten years. They have also been used in several hospitals, for which places we make a special, less elaborate, and cheaper class of fittings.

A personal inspection will convince any one of their superiority. Their increased cost over that of an ordinary copper-lined bath tub should not be a consideration to those who can afford to live in a house worth over $15,000, and would not be if their cleanliness, inviting appearance and durability was appreciated.

MEYER, SNIFFEN & CO.

46 & 48 Cliff Street,
New York.

N. B.—We have imported a line of sinks, which are made of the same non-absorbent material as the ROYAL PORCELAIN BATH TUBS. They are admirable for Hospitals. They have been used in some of our elegant New York residences, where their expense was no objection. They are one and one-half inches thick, and are less likely to be broken than cast iron. We have a size in stock that would make an admirable "Foot Bath."

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There is a tendency in some quarters to demand a Hopper form of Water Closet and to dispense with what are called mechanical parts. This would be desirable, if the so-called mechanical parts did not secure advantages in the matter of a large body of water in the bowl, not otherwise obtainable, without resorting to methods not everywhere applicable or sufficiently demonstrated as practicable.

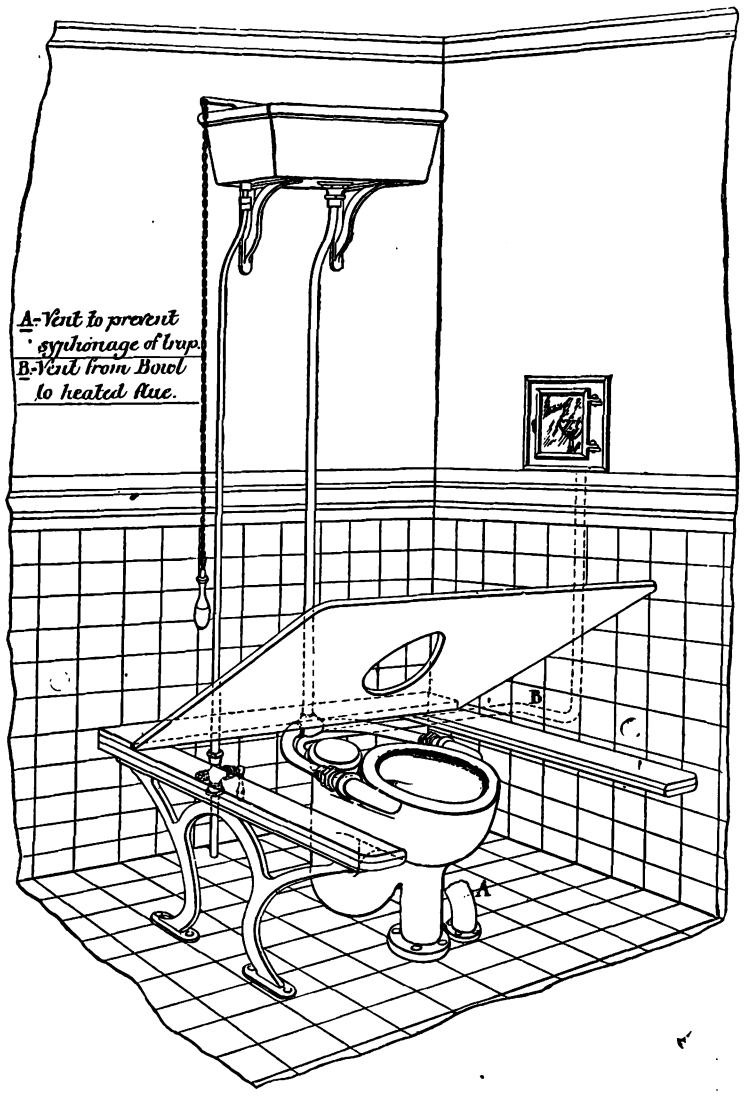
The Brighton Closet here illustrated is, we believe, the best compromise yet devised between the Hellyer form on the one hand and the Hopper on the other.

By examining the sectional cut, it will be seen that the bottom of the bowl is covered with water, while the flush and shape of the bowl is such that the trunk on the back is kept clean.

It is attractive in appearance, being all in one piece, of white earthenware.

The pipe *B*, connected with the trunk, can be run into a heated flue when desired.

These Closets have had a large sale in England during the past four years. We have had them in use in our factory nearly two years—and we now offer them to those who prefer a different form of Water Closet than the *Hellyer, which, by the way, does not, in a single instance, so far as we know, fail to satisfy those who have them in use.*



This will be known as

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Persons interested are invited to call at our warerooms, Nos. 46 and 48 Cliff Street, New York, or at No. 1 Pemberton Square, Boston, and examine this and other specialties that we have fitted up with water attached, including THE ROYAL PORCELAIN BATH, THE MODEL PORCELAIN SLOP HOPPER, THE HELLYER CLOSET AND HOPPER, THE HOADS HOPPER, DOHERTY SELF-CLOSING COCKS, FULLER FAUCETS, etc.

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Plumber's Furnace.

Several improvements have been made lately.

Send for full descriptive circular and price list.

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Manufacturer of
PLUMBERS' CASTINGS.
Cast Iron Soil Pipe and Fittings.
Extra Heavy Soil Pipe and Fittings, Sinks, Bell Traps, Cesspools, Hoppers, &c., &c.
Green House Pipe, Bends, Branches Manifolds, &c., &c.
Send for Illustrated Catalogue and Price List.
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POLISHES
Are unrivalled in their excellence, and always give satisfaction.
LUSTRO METAL POLISH,
For Silver, Nickel, &c.
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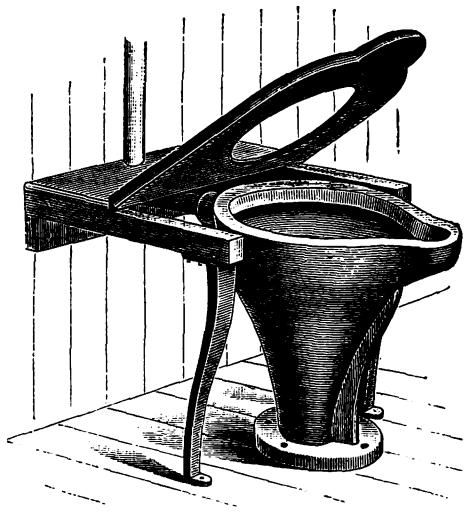
For Ladies' and Childrens' Shoes.
LUSTRO STOVE POLISH,
For Manufacturers' and Household use.
LUSTRO BOOT AND SHOE POLISH,
Superior to all others.
Beware of Imitations.
For Sale by Dealers in Plumbing Supplies, and in fact everywhere.

MADDOCK'S
DELUGE HOPPER,



WATER CLOSET and LIP URINAL
COMBINED,
WITH FLUSHING RIM.
Designed for Hotels, Factories, Stores, Public Buildings, Tenement Houses, Hospitals, Railroad Depots, &c.
Can be seen in operation at our New York Warerooms.
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MANUFACTURERS OF
Sanitary Specialties in Earthenware,
Besides all the staple wares for Plumbers' use.
All our goods guaranteed Equal to the Best Imported War
POTTERIES: TRENTON, N. J.
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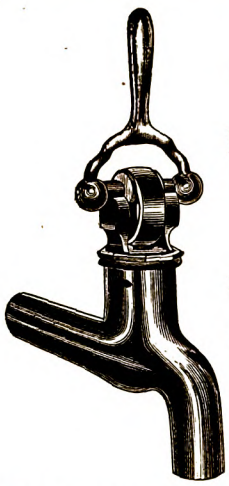

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SELF-
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Every one warranted

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Our goods are sold to the leading houses in the United States, and we guarantee the quality equal to that of the best imported.

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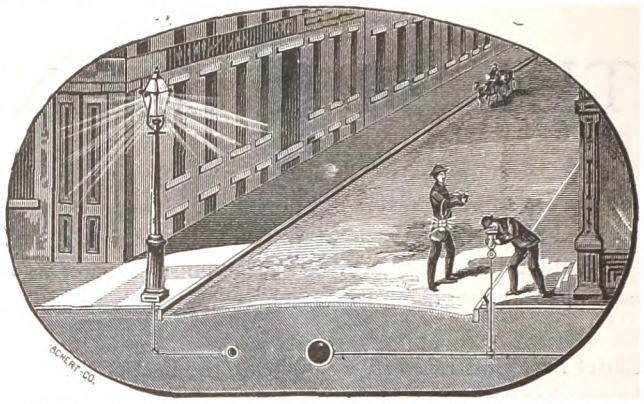
Sole Proprietors of the Patent System for Waste Water Prevention.

The Simplest, Cheapest and Most Efficient Method.

Requires no Preparation Where Outside Stops Exist.



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The Waterphone is Specially Adapted for the Uses of Plumbers and Machinists.

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General Agents, and Sole Manufacturers for the West, of
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The Original and most Reliable SANITARY WATER CLOSET in the World.
200 Vine Street, Cincinnati, O.

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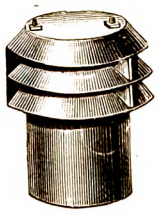

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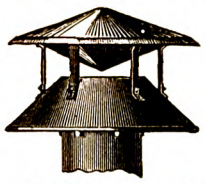

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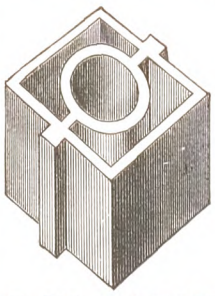

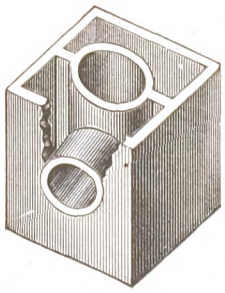

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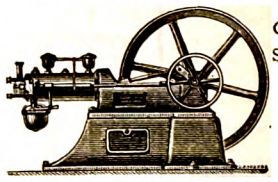

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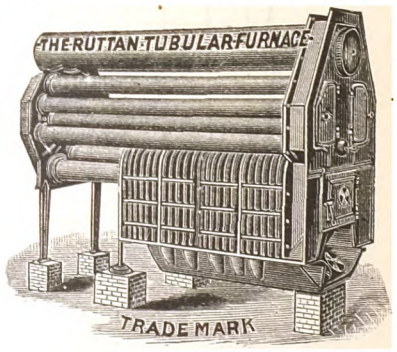

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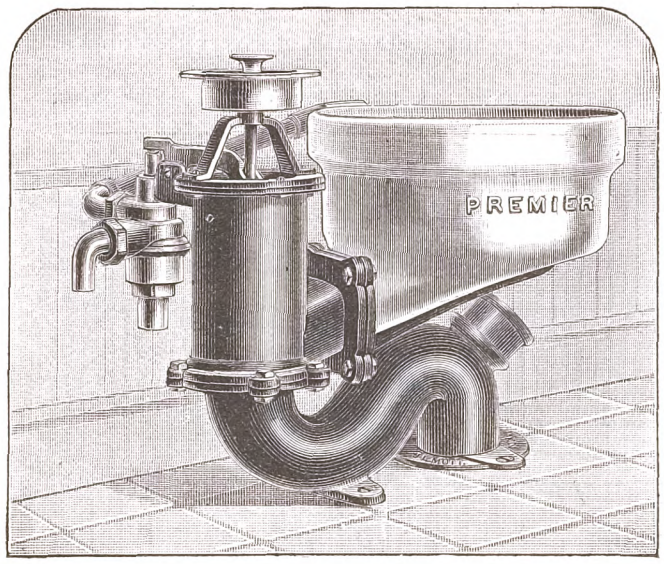

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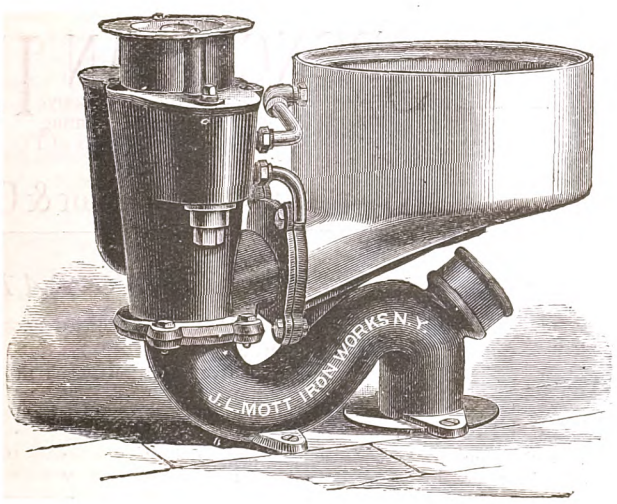

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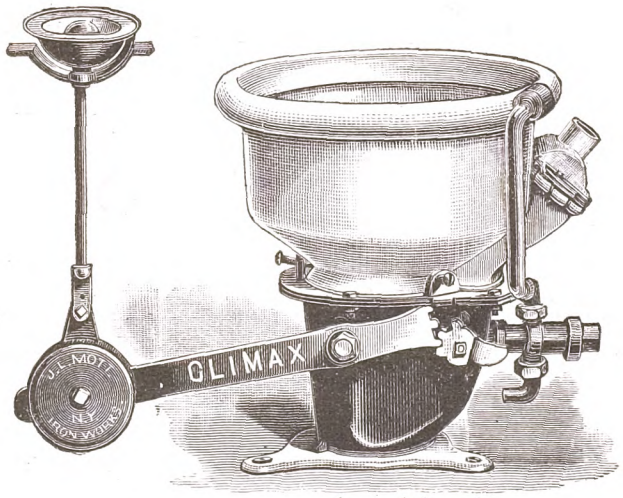

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THE NATIONAL BOARD OF HEALTH IN CONGRESS.

The Congressional Record of Feb. 21 contains the debate in the House of Representatives upon that part of the Sundry Civil Service Appropriation Bill where the appropriation for the National Board of Health ought to have been, but was not.

The attack upon the Board was made by Mr. Ellis of Louisiana, as the mouthpiece of the Louisiana State Board of Health and of the Marine Hospital Service. He alleged useless extravagance on the part of the Board, more particularly in regard to the investigations which they set on foot in regard to the causes of disease, and in proof produced what he stated was a record taken from their own books showing the items of expenditure. This record, he said, had been furnished him by a member of the Board, but he subsequently said that he gave it on the authority of the Surgeon-General of the Marine Hospital Service. He brought up the old charge that the Board attempted to create the belief that yellow fever existed in New Orleans when that city was in perfect health, and denounced the system of inspection which was established there to prevent the commerce of the Valley from being interfered with. He was replied to by Mr. Dunn and others, who showed the absurdity and incorrectness of his statements, but under the lead of Mr. Hiscock, the Chairman of the Committee of Appropriations, the House refused to make an appropriation for the Board.

As the House is organized, this was a foregone conclusion several months ago, and the various petitions which have been pouring in from State Boards of Health and Sanitary Associations during the winter do not seem to have had the slightest influence.

It cannot be supposed that Mr. Ellis is so grossly ignorant, as his attempt to ridicule such important work as that of Prof. Mallet in water analysis would imply, and we must therefore conclude that this attempt, together with his sentimental rhodomontade about the Angel of death, etc., was a piece of pure demagogism intended for local effect to secure the backing of the New Orleans Board in the next election.

Taking them altogether the investigations made under the direction of the Board have been of great value, and no expenditure has ever been made by the United States to better advantage than that of the comparatively small sum paid for them. We print elsewhere extracts from the debate, and call particular attention to the remarks of Mr. Manning and Mr. King.

Instead of appropriating money for the use of the Board, the House voted to allow $100,000 to be expended under the direction of the Marine Hospital Service in case of epidemic.

We print elsewhere a statement by Hon. Thomas Carson, the Mayor of Brownsville, Texas, which shows how this fund is likely to be used. No matter how desirous the officers of the Marine Hospital Service may be to do the work in the best possible way, it is evident that the Custom House officers will control the appointments, and that in doing this they will be governed mainly by political considerations. The Brownsville cordon cost about twice as much as all the scientific investigations of the Board put together, and it is extremely doubtful, to say the least, whether it did any good. Certainly the methods employed were very different from those recommended by the sanitary authorities of this country or of Europe.

It is to be hoped that the Senate will correct this blunder of the House, and insist that the appropriotion of $100,000 to be used in case of epidemic, shall be placed under the direction of the National Board, or be stricken out altogether.

THE CHARGES AGAINST THE DEPARTMENT OF PUBLIC WORKS.

The letter from the Commissioner of Public Works to the Mayor, which we publish in another column, sustains the position which we took in July last (page 162) when the charges to which the Commissioner refers as having been made before the Mayor's Water Committee, were presented in one of the daily papers. We then expressed the opinion that only a fool would trifle with the water supply, and take the chances of doing irreparable injury, for the sake of getting an opportunity to oversee the expenditure of a few millions of public money, and that "the measures necessary to produce a deficiency cannot be taken without the connivance of so many persons, holding positions of trust, that their detection in case of an investigation would be certain, and would consign all persons involved to such infamy, that it is impossible to believe that they would be taken by anyone of ordinary foresight and regard for his own reputation."

A few days ago some persons laid before the Mayor's Committee some questions to which they requested the Commissioner of Public Works to give answers. These questions were so absurd in themselves, and displayed such an utter ignorance of the rudiments of natural philosophy and of practical common sense that the Committee and Commissioner of Public Works would have been perfectly justified in declining to pay any

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attention to them. But Mr. Thompson has seen fit to treat the matter with an amount of consideration which we consider uncalled for, and asks the Mayor to make an official and thorough investigation of the flow of water in the aqueduct between High Bridge and the 92d street reservoir, and satisfy himself whether or not there are many millions of gallons surreptitiously abstracted between these points. Under the circumstances we hope his request will be granted, and that the examination will be made, and made thoroughly, and the result printed, with diagrams and explanatory remarks. It might put a stop, for a little while, to the frantic assertions that the Commissioner of Public Works is not only an astute knave but also a drivelling idiot.

We are not in sympathy with all the ideas and many of the methods of this department. We believe that it, in common with other city administrative offices, is managed with too much regard for political expediency and too little for the public welfare. We think it highly probable that a good deal more could be done in the way of preventing waste of water, than is doing, or has been done, and without more expense to the public. Yet, we must protest against such senseless abuse of any official, as has been lavishly spread before the Water Committee, without a single fragment of evidence to sustain it.

This, which has, to a certain extent, been forced upon the Mayor's Committee, is the only side issue they should meddle with.

That New York needs a better managed system of water distribution is manifest. That it needs an additional supply is evident to all who have examined the subject. Let the Committee, then, prove to their own satisfaction and that of other fair men who know no more of the laws of flowing water than they do, that the aqueduct is now carrying all the water it can, and they will be ready to report on the first question submitted to them, viz.: Is more water needed?

Then let them consider how the additional water shall be procured, not whence shall it come, for that involves the consideration of too many technical questions for a body without either scientific or legal advisers, but what organization will be the most efficient and will best protect the public interest, by whom should its members be chosen, and to whom should they be directly responsible, are questions quite proper for their consideration and upon which no collateral issues should be permitted to delay their report.

That matter being settled the problem of distributing the present supply, how it can best be utilized and conserved, pending the introduction of a new supply, might with advantage be looked into by a committee whose report would secure public confidence. A portion of this committee should be men who have held administrative positions, and others should be those who by education and occupation are familiar with the technical questions involved.

WHAT ARE YOU GOING TO DO ABOUT IT?

The calamity of the parochial school in Fourth street, by which sixteen children were killed and a number of others injured, is one which calls forth the usual comments from those who are responsible for the condition of things which made such an occurrence possible.

There was a narrow, steep, and comparatively dark, staircase with a frail baluster. An alarm of fire was given—there was a rush—the baluster gave way on the second story—further details are unnecessary.

It is reported by the daily press that the Directory are astonished at what has happened, and deeply regret it, and that the church to which the school belonged will provide burial for those children whose families are unable to pay the undertaker's expenses. It is to be feared that the mothers of these children will find small consolation in this. It is easy to moralize over the matter; to show how faulty was the construction; how careless were the directors; how ignorant or inefficient the inspector of buildings who approved such a construction; to point out how many other school buildings are in the like dangerous condition, etc. It is also well to remember that such moralizing, like most other easy work in this world, does very little good. There are not in this city of New York half-a-dozen school houses that are properly arranged and constructed with reference to the health and lives of their occupants. So much we ascertained several years ago in connection with our competition for plans for a model school house. But the school commissioners and their architect are satisfied; they do not anticipate any trouble, and will, no doubt, deeply regret what they will describe as an unforseen accident when it occurs. Is there any way by which such officials can be made wise and prudent, and fitted for the heavy responsibilities as regards the health and lives of the coming generation which devolve upon them? If there is we do not know it. Solomon took much the same view of the situation when he remarked: "Seest thou a man who is wise in his own conceit, there is more hope of a fool than of him."

NEW YORK'S WATER SUPPLY.

No. VI.

THE SUPPRESSION OF WASTE.

(Continued from page 226.)

Having in our previous article explained the details of the house-to-house inspection of water fittings as practiced in Manchester, we will now describe the methods adopted in the examination, testing and stamping of fittings.

As before stated meters are used in all buildings except dwellings. The following is the plan adopted in the testing of the meters:

There are two tanks, one holding 110 gallons and the other 180 gallons. On the front of the tank is a glass tube like a thermometer glass; the water line indicates on this tube the exact quantity in the tank. The meter is first tried by letting a hundred gallons run through as quickly as possible. The other test is to allow it to pass through in a period of ten hours. As the quantity passed by the meter in either case is known, the reliability of its record can be ascertained.

It has been stated that the receipts from fees for stamping fittings, together with the additional rates collected for uses to which water is put, discovered only by the house-to-house inspection, pay the entire cost of maintaining the waste preventing staff. The following scale of charges may, therefore, be of interest: For bibbs and stop cocks, two-pence each; ball cocks, three-pence; cisterns, six-pence; water closets. six-pence.

Three men do all the testing in Manchester, and they approve and stamp on an average about fifty thousand fittings in a year, which includes bibbs, stops, cisterns, water closets, stopcock valves, and any fitting used in the distribution of water. A portion of these stamped fittings are used in other towns in England, the practice being that smaller places that cannot afford to maintain a testing office require that fittings used in connection with their water supply shall bear the Manchester, Liverpool, or Glasgow stamp, or that of any other city whose stamp is a guarantee that the article is reliable. By this means it will be seen that other places contribute something towards the support of the testing office.

The rejection of fittings at the present time, after, of course, a number of years' inspection, is about as follows: the four leading makers, about five per cent., the others about 12 per cent. Most of the rejections are due to imperfect seatings, it being understood that compression or screw-down cocks are required; sand holes, also, are a very considerable cause of rejection. The former defect is revealed by taking the tap apart; the latter by the pressure test, which is 300 pounds to the inch.

Ball cocks have the size of the ball and length of the lever prescribed. They are tested by turning them upside down and placing a half pound weight on the ball, and then subjected to a hydraulic pressure of 150 pounds to the inch, which is regarded as equivalent to three hundred pounds when the ball is floating. The lever is stamped at both ends to prevent a plumber from shortening it. Waste-preventing cisterns are carefully examined and care is taken to see that the valves are so hung that they cannot both be suspended or off their seats at the same time.

The fittings are usually sent by the dealers in quantities to the testing office, as the plumbers will not buy them unless stamped, except in the case of an odd fitting required for special work, which the plumber, to save time, sends direct.

Taps are first weighed singly; if of requisite weight they are then taken to pieces, and a gauge is used to ascertain that the seat allows a good bearing for the washer. It is also examined to see that the thread is sufficiently long so that the stem will fit well in the cap and not wobble. Any deficiency in either of these particulars secures the rejection of the tap. The stamping of the maker's name on the tap is not insisted on, and with well-recognized makes every tap is not taken apart.

Doubtless the attempt to enforce similar rules in this city would provoke strong remonstrances from dealers and plumbers, who might at times feel annoyed at the restrictions. The former, especially, would have to find other markets for inferior goods and undoubtedly would make the strongest opposition. In this connection, therefore it may be well to recall the statement of a leading plumber in Manchester, who, when asked his opinion of the rules and their working, replied that through oversight of his workman, and failure to report changes made, he had several times been fined; that at first he had felt much annoyed at being obliged to wait to get special fittings stamped, yet, after his years of experience, he was bound to admit that his punishment had been deserved, was just and proper and that were he a water works engineer, entrusted with the duty of serving the public by preventing the waste of their water, he should do just as the authorities of Manchester did.

[TO BE CONTINUED.]

The meeting of the State Board of Health of New York in this city, last week, a report of which is elsewhere given, was an important one in several respects. Manufacturers had expressed considerable dissatisfaction at some proposed rulings with regard to mixtures. The Board therefore wisely and promptly decided to hold a special meeting in New York in order that manufacturers could confer with them. This was done, and all sides of the question were discussed, and as a consequence, the Board promptly showed their disposition to exercise the discretion vested in them by subsequently passing resolutions that embodied substantialy the views of the majority of those that expressed themselves on the subect. One important fact was made plain, and that was the necessity for the law.

A manufacturer who frankly stated that he was talking "business," and that this was "dollars and cents" to him, and that if the law was enforced as it was proposed, he would have to transfer his business to another State, contended that he thought it a hardship that he could not make and sell to ship owners a mixture as coffee in which no coffee was present, but which was given to sailors for coffee, said stuff selling for seven cents a pound; when asked if there was anything stimulating or nutritious in this compound that was for sailors exposed to wind and weather, he said, "Oh, yes. Why, I sell it to some of 'the public institutions of this city,' and the inmates are 'able-bodied and hearty.'" Fortunately, and to the credit of the merchants present, this gentleman's views were not endorsed.

The rulings made are such that while the purchaser is protected, no needless restriction is placed on legitimate trade.

Now, if further exemption is wanted, let manufacturers make their wishes known to the Board and we are satisfied that reasonable and proper requests will be fully considered.

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SANITARY ARRANGEMENTS IN THE HOME FOR AGED FEMALES.

HOT WATER SUPPLY.

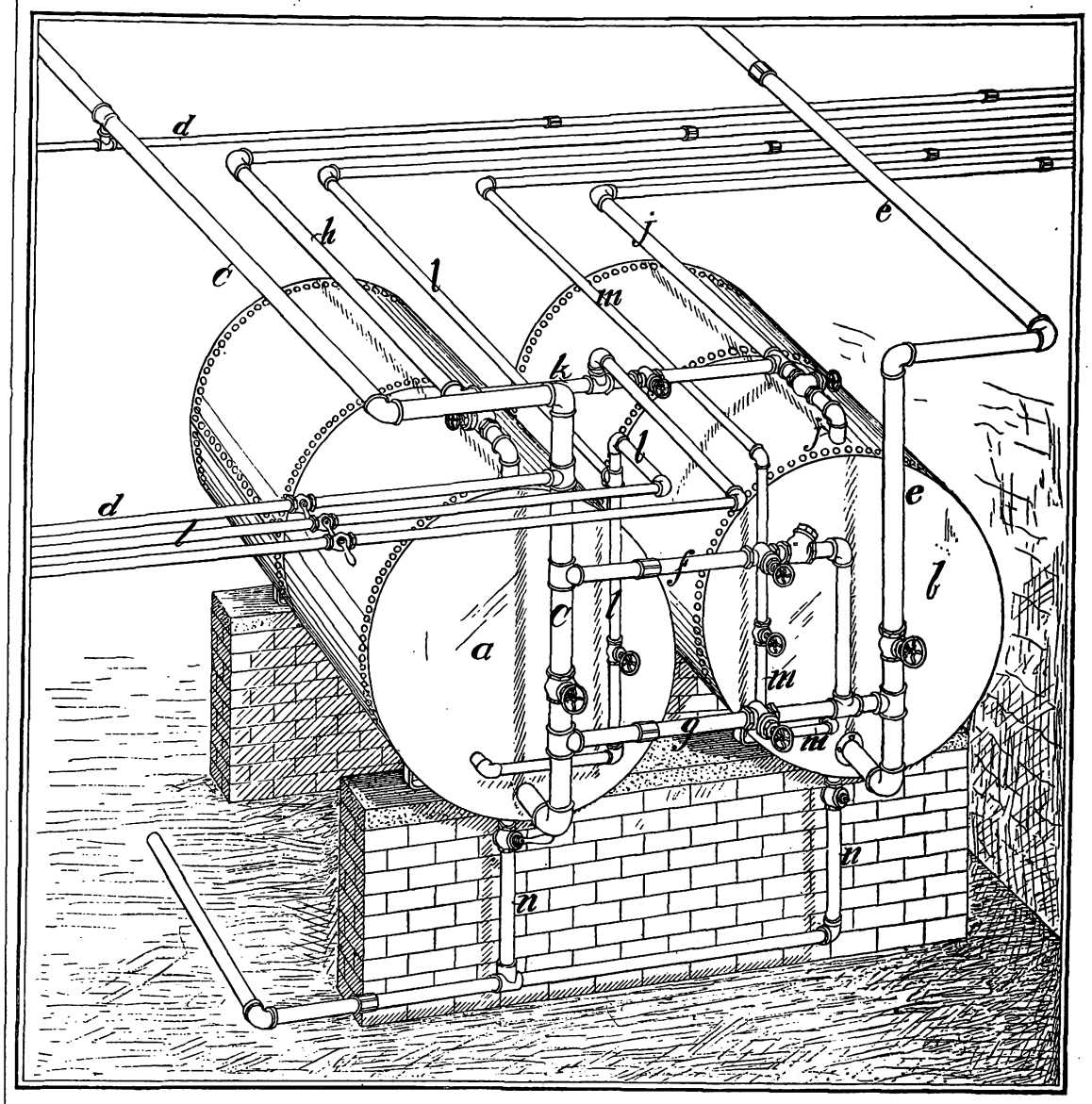
The building designed for a "Home for Aged Females," now in process of construction at the corner of 104th street and 10th avenue, contains some features in the plumbing work which we think will interest many of our readers. The building is of brick, four stories high, with basement and cellar. It is about 135 feet long by 45 feet deep, with a wing 28 x 40 feet at each end. It has about 90 rooms and is intended to accommodate about 100 persons. Mr. R. M. Hunt is the architect and Mr. John Toumey the plumber.

In the present article we shall consider the water supply, particularly the system of hot water distribution. We may subsequently describe other parts of the plumber's work, and possibly the heating and ventilation.

The supply from the street is through a 3-inch iron pipe, which, after passing a meter, goes directly to a steam pump, which supplies, through a 2-inch pipe, an iron tank of about 1,800 gallons capacity at the top of the house. From this point the system may best be understood by reference to the accompanying drawings, which show most of the pipes.

The large drawing represents the hot water reservoirs or boilers and connecting pipes. The reservoirs are of iron (painted), each of about 450 gallons capacity, and the pipes, like all the water supply pipes in the house, are of galvanized iron. The reservoir marked *a* is supplied directly from the street pressure through the 2-inch pipe *c*, which is a branch of the 3-inch pipe from the street to the pump. This, in turn, has branches, *d*, *d*, to fixtures in the basement and on the first floor. The reservoir *b* is supplied from the tank through the 2-inch pipe *e*. The two supply pipes *c* and *e* are connected in front of the reservoirs by a 1½-inch pipe, *f*, which has on it, beside a stop valve, a check valve opening toward the tank. When the street pressure exceeds the tank pressure this valve will open and admit water to the tank boiler direct from the street. It also opens a communication to the tank through the down supply pipe *e*. The upper part of this pipe connecting with the tank is shown in the smaller drawing. The check valve *c* closes toward the tank, preventing the admission of water from the street through the down supply pipe, in order to prevent waste, for nothing would stop the flow, and after the tank was full the water would be lost through the overflow. But to enable the street pressure to supply the tank without loss, when the pressure is sufficiently great, a branch, *b*, is taken from the down supply *e*, carried up over the tank, and a ball cock placed on its end. In this branch, over the tank, a small pipe, *d*, is inserted, which is always open to provide for relief in case of any expansion when the ball cock is closed. The supply pipe from the pump is marked *a* in the smaller drawing. There is a ¾-inch tell-tale pipe from the tank to the engineer's sink in the cellar, having a funnel-shaped opening at its upper end. The overflow is 4-inch upon the roof. This also has a lead funnel in the tank, measuring about 10 inches across the top.

To return to the larger drawing, the supplies to the two hot water reservoirs are also connected by a 1½-inch pipe, *g*, below the other, to provide for the supply of the street pressure boiler from the tank in case the former supply temporarily fails. The water is heated by a flat (horizontal) coil of 1¼-inch steam pipe placed in about the middle of each reservoir. These coils will be connected with the return pipes from the coils used to heat the air for the rooms in winter, and from the elevator in summer, since they are expected to furnish sufficient heat for the purpose. It is not desired to heat the water to a very high temperature, since a return circulation system is used, and no provision is made for direct relief for expansion and steam. If the hot water pipe had been extended up over the tank as is usual, the hot water would have escaped into the tank, since the street pressure now rises to that height during a large part of the time.

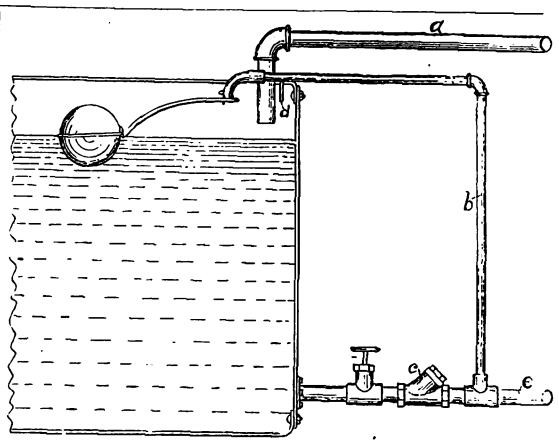


HOT WATER RESERVOIR AND CONNECTING PIPES IN HOME FOR AGED FEMALES.

The street pressure reservoir, *a*, is arranged to supply directly only as high as the first floor (through the 1-inch pipe *h*). The tank pressure reservoir, *b*, supplies the fixtures above the first floor through the 1½-inch pipe *j*. But these two pipes are connected by a 1½-inch pipe, *k*, so that either reservoir may supply the fixtures immediately connected with the other. The return circulation pipe, *l*, to the street pressure boiler is ¾-inch, and that to the tank boiler (*m*) is one-inch. The 1½-inch iron pipe *n* is for emptying the reservoirs into the house drain.

Most of the fixtures are at one end of the building, about 100 feet distant from the hot water reservoirs. The connecting pipes are carried through the cellar, suspended from the ceiling. The branches going to the left are to the laundry, which is in the wing at the opposite end from the kitchen, the water closets and the baths.

An anecdote that falls in with what we said a few issues ago about the air supply to furnaces was related by a well-known sanitarian at a public dinner last week. He had once examined a building in the near vicinity of New York when he found that the janitor had carefully closed the valve in the cold air pipe to the furnace, and turned the pipe into a chicken coop. As the speaker pointed out, ignorance of the simplest details of house construction, like this, on the part of those in command of them, is responsible for a good deal of the foul air.



END OF HOUSE TANK, WITH CONNECTING PIPES.

PROGRESS OF THE PLUMBING ORDINANCE AT PHILADELPHIA.

The committee of twenty-one appointed some time ago by the Survey Committee of Council to devise a code of sanitary laws and regulations held a meeting on February 21st in the Survey Department of the Public Buildings, Mr. J. J. Weaver presiding, and fifteen members present. Two ordinances were presented, one of which was prepared by Chief Engineer Smedley, of the Survey Department, and had been approved by the master plumbers; it put the matter of sanitary regulation under control of the Survey Department, while the second, presented by the Architects of the committee, provided for the forming of a Sanitary Commision Board to be composed of five physicians, five plumbers and five architects, and it shall form a division of the Board of Health. The architect's ordinance provides that the commission shall appoint eight inspectors; the latter ordinance is based on the acts in force in New York and Brooklyn. The committee seemed to favor the forming of the commission and the inspectors.

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ATLANTIC COAST RESORTS.*

(Concluded from Page 268.)

In General.—The watering places on the Atlantic Coast of New Jersey are all more or less in a transition state—few have adequate water supplies and none are supplied with sewers. The plumbing is for the most part poor in planning and construction, but the maintenance. as a rule is good, while some is excellent. Without exception hotel-keepers and others express a desire to have their premises in good order, both inside and out if a way were but pointed out.

Many of the towns and villages have large populations, and their sanitary condition is becoming of the utmost importance. The bulk of the seaside places are as yet summer resorts only, though each year sees a larger number of winter guests, and at some communities, notably Atlantic City, the winter season has become quite an important factor in the municipal economy.

Bar Harbor, a village in the town of Eden, Mt. Desert, Maine, is without doubt, at the present time, the most popular watering place on the whole Atlantic Coast. It faces north and northeast, towards the Sullivan Hills and the upper end of Frenchman's Bay, the mountains of the island coming close to the outskirts of the village on the other two sides.

As there appear to be at least half a dozen other places on the island where the physical conditions would seem superior, and that are geographically more accessible, just why Bar Harbor was the one place on Mt. Desert that attracted people most is a question that has never received a satisfactory answer.

The soil at Bar Harbor is for the most part, a stiff, retentive blue clay, holding considerable water; sufficient in quantity to render even some of the higher portions of the village decidedly wet in mid-summer.

To the westward of the village, 1½ miles distant among the mountains, is Eagle Lake, a beautiful sheet of water finding an outlet through Duck Brook to the salt water at a point perhaps a mile north of the village. Just below the lake Duck Brook is dammed, making a reservoir, from which the public water is drawn. Until 1882 this was carried in a wooden sluice, sometimes covered and at other times open, across pastures and wild land to a second reservoir or tank, constructed of wood, immediately adjoining the village. From this last reservoir the service pipes, of iron, deliver water to customers throughout the the village. This public water up to 1881 was used only during seven months in the year, the old wells, in existence previous to the introduction of public water, being brought into service again during the winter. In 1881 a new reservoir, having capacity of some millions of gallons, was built of earth, on the line of the sluice connecting the two reservoirs, and a 9″ cast iron pipe laid over a new line from this new reservoir to the village. This gave a greater head of water (185 feet) and furnished a much more abundant supply. The old tank was very leaky and the flume lost more water along its line than it delivered at the tank.

The water works are owned by a private corporation which increases the facilities as fast as there is any demand. So popular has it been that at the present time it is rare to find a house in the village with either well or cistern water.

There are three main public sewers in the village and in addition all the laterals necessary to give the best service to the entire community. For some reason, unknown to the writer, all sewers are cement pipes, eight inches in diameter, with man-holes placed from 500 to 600 feet apart; in every way intended to secure the best of sewerage. Five thousand dollars of the public money was spent on this item alone, at Bar Harbor, during 1881.

All main sewers are intended to discharge below low water, and this is necessary, because sewage deposited on the shore from drains discharging at a higher level has already made itself obnoxious at one or two points.

All the principal hotels (there are nearly twenty of them) and most of the cottages are more or less thoroughly plumbed, and their drains connected with the sewers. There are very few privies in use in the village, everybody preferring and using water carriage, while cesspools are equally rare. Curiously enough, there is to be found here, side by side, some of the worst cases of "skin" plumbing and others of the most beautiful construction and ingenious planning. The reason is evident enough. Till comparatively recently Bar Harbor was a fishing village, where the occasional summer tourist was fed mostly on salt fish, doughnuts, and huckleberries. The few cottages that constituted the village depended upon wells and cesspools, or, perhaps, wells without cesspools, for their water and drainage. Suddenly Bar Harbor became a fashionable watering place, the fishermen's cottages gave place to great tinder-box hotels, each accommodating hundreds of people; and the little primitive fishing village of twenty years ago is to-day provided with macadamized roads, water works and sewerage, with street lamps, telegraph, daily papers, and a club. At first the people failed to realize the change and retained the wells and cesspools, till the typhoid outbreak at the old Bay View House, caused by a leaky drain, brought them to a realizing sense of the situation. Aside from the painful result of the cases of typhoid referred to, probably there could have been no more useful lesson given to the citizens, and the present sanitary arrangements are the legitimate results of the changes begun at that time. Even "skin" plumbing has the merit of being a move in the right direction.

As a rule, the private houses are better plumbed than the hotels, and many of the latter will have to be entirely re-plumbed before they can be considered satisfactory, but the gratifying fact is everywhere observable that, without exception, householders express anxiety to perfect their drainage arrangements so that there can be no question in regard to them.

The English plan of having the soil and main wastes pipes outside the walls of the house, is here more generally in use than at other places visited. For a house occupied during a few of the warm months each year only, there seems to be no valid objection to the introduction of this arrangement of plumbing, even in the cold climate of Mt. Desert, and it possesses a very decided advantage, where the work is of doubtful quality, in being largely out of doors; hence, less liable to injuriously effect inmates. Bar Harbor is very like a rapidly growing Western town, and the surroundings of some of the houses are sometimes left in very primitive condition. Instances of this are indicated in the two plates shown, made from photographs, altered slightly to avoid too personal an application.

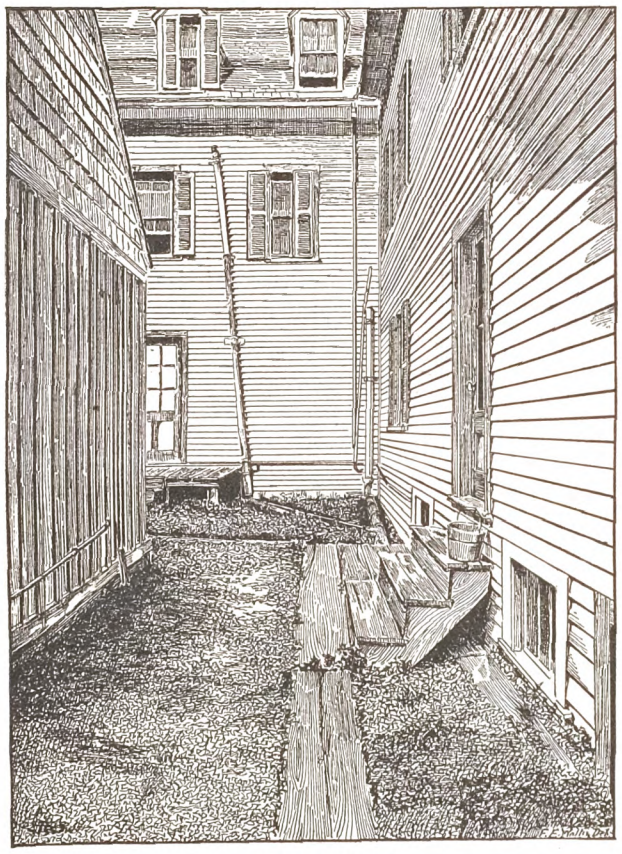

PLATE I

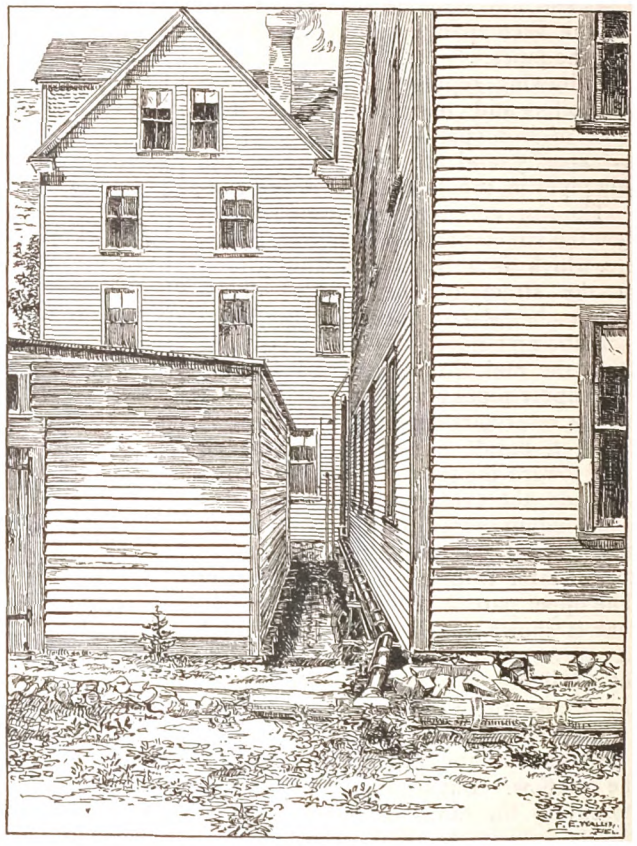

PLATE 2

Plate No. 1 shows the back of a hotel accommodating 125 people; two lines of soil pipe and a bath-room waste and house leader (all on the outside of the house), which deliver into a vitrified pipe, laid on the surface of the ground. This pipe runs parallel with and close to the side wall of the building, and in the foreground of the picture is just under the plank at the right. The kitchen, at the left, connects with vitrified drain by a lead pipe near the kitchen steps. This pipe is perhaps two or three inches under ground. It is not unusual for market wagons to drive between the two buildings, and the vitrified pipe has been more than once broken at the joints by contact with the wheels of a vehicle.

Plate No. 2 represents the same general arrangement, except that the drain pipe is supported on a plank, and the ground water (within 18 inches of surface) has not been

* Report of E. W. Bowditch, C. E., to the National Board of Health.

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drained off. The main drain consists not of vitrified pipe alone, but of vitrified, cement and iron pipes, patched together in an inexcusable way. This pipe has also been broken a number of times by teams striking it. The proprietor of the house stated (it has since been corroborated by fact) that he considered his outside arrangements of only a temporary character, and that they were put up in a great hurry in order to be able to open the house for the season.

A local board of health of three members was organized in 1880, and although an excellent beginning has been made, a few further changes might be instituted to good advantages. Garbage is regularly removed by scow and dumped in deep water in Frenchman's Bay, and people are forbidden to throw it in the streets as was formerly done. The collection might be better made in water tight carts, but at present every one attends to his own carting. All nuisances are abated, etc., etc.

A rather unusual nuisance which has recently been abated at Bar Harbor, is a settlement of Quoddy Indians, comprising some seventy-five families, who camp during the summer months as near the village as possible, selling baskets, etc., etc., to visitors. In the past they have been a positive source of danger, owing to their filthy habits, but after an experience of several fatal cases of diphtheria, and a consequent scare among the summer guests, the Indian colony was put under the charge of the Board of Health —with excellent results.

The resident population of Bar Harbor is not over 1,250 souls, and the hotel accommodations are not for so large a number as is generally supposed. In the middle of the season there may be 5,000 guests—not more, though it is the custom to entertain four or five different sets of visitors during the season.

It would be a large estimate, however, to claim that there were 20,000 guests at Bar Harbor during any season. Undoubtedly the shortness of the visits made is an element to be considered in the freedom of the visitants from preventable disease, although a consideration of this kind should not abate one jot all sanitary precaution possible, since it is well, even from the narrowest possible commercial view, to establish the health of this favorite resort as best beyond all question.

Summer resorts, when first started, naturally depend upon either well or cistern water for drinking and cooking supplies. As a settlement grows, the well water, unless artesian, deteriorates in quality. As soon as this pollution begins, other water should be used, and as it is frequently impossible to obtain a public supply, cistern water of necessity is made use of.

Rain water, at least, must be pure, is the saying, and so it is, if properly collected and stored. As many people use cistern water to the exclusion of all other, a list of memoranda taken from the field notes of a single season's work may prove of service to readers.

Cisterns have been examined, mostly for cause, and many found to contain impure water. The different causes for the contamination, arranged according to the frequency of their occurrence, are as follows:

First.—Rotten shingles, leaves, hair, roots of trees, string, paint, putty, paper, etc.

Second.—Thin, improperly built brick walls, badly constructed inflows, and leakage from drains and cesspools (many brick cisterns, arched, and covered with loam and sod, show arches and walls above inlets not perfectly tight, manure used as top dressing on the grass overhead not infrequently soaks through).

Third.—Excrement of birds on the roof from which the water is drawn.

Fourth.—Chamber slops thrown on the roof, and thence passing direct to the cistern.

Fifth.—Overflow emptying into cesspool or drain, and receiving gas or liquid from the same on account of partial or total stoppage of drain, or filling of cesspool.

Sixth.—Walls, partially constructed of brick formerly used in old privy vaults.

With the exception of No. 3, the causes of pollution enumerated are all preventable, and within the grasp of the proprietor. Not so, however, frequently with wells and sometimes with public water supplies, and where any doubt exists as to the quality of the drinking water it may be stated in general terms, that rain water collected from a clean roof, slated preferred, passing through metal gutters and leaders, into a carefully built, cement lined, cistern (having overflow connecting with no other drain) and then through a two-inch brick filter, should give a very fair quality of water, fouled perhaps to a slight degree by the chimney flues and birds, and possibly a trifle hard, but usually not enough to constitute a valid objection to its use. This, of course, applies to country houses only.

In construction, the acknowledged fact of the porosity of all brick and cement work, no matter how carefully put together, is frequently lost sight of, hence many of the cisterns when empty, or partially so, have a tendency to attract water from the outside.

It is obvious that years of steady intelligent work must elapse before summer hotels are sanitarily what they ought to be, and probably still longer before private houses can be considered wholly satisfactory, but if the resorts visited represent a fair average, there is good ground for hoping that the efforts of local boards of health will speedily produce good results of a tangible nature.

It is worthy of mention that with the single exception of Newport, where the existing condition of things may be considered abnormal, local boards of health have proved of decided advantage, always to the comfort, and frequently to the pecuniary well being of the communities they serve.

SUGGESTIONS ON RAISING THE PERSONEL OF PLUMBERS.

To the Editor of THE SANITARY ENGINEER:

I think it will be allowed by those having a thorough knowledge of the facts, that the plumber occupies at the present day, at least in this country, a somewhat equivocal position. He is classed by the general public as a tradesman or mechanic, and, at the same time, a scientific knowledge and practical skill is expected of him that would not disgrace many of those holding scientific and professional rank. While, of course, he must be skilled in the hard part of his business, and have a practical knowledge and practice in the manipulation of the many substances that he is compelled to use, yet, in order to apply these substances, so that certain results may follow, he must, of necessity, be well informed in the science of his business. This scientific knowledge is not to be acquired in the ordinary way in which trades are acquired, and so far no means, or, at least, very limited means of acquiring this knowledge is within reach of the ordinary plumber. An attempt is being made to supply this deficiency by the employment of men who have had more or less scientific training, and who call themselves sanitary engineers. While these gentlemen have no doubt done a vast deal of good, both practically, and by calling the attention of the public to the necessity of such knowledge as they possess being employed, still, in my opinion, the actual want will not be filled until we have a class of plumbers who, while having a practical knowledge of what may be called the strict trade part of the business, shall, at the same time, possess the scientific training necessary, and any permanent improvement must have this end in view. The plumbers of to-day occupy a somewhat similar position to what doctors did some centuries ago, when the barber and surgeon, the herbalist, and quacks of all sorts practiced the healing art—and the practice was certainly not in the direction of the greatest good to the greatest number. What would be thought of a surgical operation presided over by a scientific gentleman who was thoroughly informed in the laws relating to the body, and the mechanical part of the operation done by a butcher under his direction? The amount of success would not be great, but given the trained surgeon skilled in both the science and practice of his profession, and the results are all that can be desired. The work of the plumber carried on as at present is very much in the same predicament as the foregoing. It is no use saying that a scientific knowledge is not necessary, as, given some one to instruct in what is to be done, the mere doing of it is only the mechanical operation requiring but limited skill and care. In order to succeed, a thorough knowledge of the results desired to be attained, and the science combined with practice necessary to produce these results, is absolutely necessary.

As the people early saw the necessity for protecting themselves from quackery, and enacted laws by which there was some certainty of the healing art being in the hands of men having at least the mental ability and some special training in the practice of their profession, and as, in the present day, the people are beginning to see that the plumber's art is one requiring some special training and skill, in order to ensure success and not render futile the efforts of the skilled physician, they must enact laws to this end and provide means whereby the wants will be supplied. When we consider the almost unanimous verdict of skilled physicians and sanitarians on the subject, it is a matter of surprise that something more has not been done in this direction ere this. Will not some of our colleges or schools of technology take this matter up and institute a special course of training for such as desire it, and confer a degree—or some mark to one who has passed such an examination, as may be deemed necessary—as will be a guarantee to the public that the holder of the same has the ability and skill necessary to qualify him in time to obtain a thorough knowledge of the art he professes? A change in this direction would, of course, be gradual, and should be so carried out as not to be injurious to those who are at present carrying on the business in the old plan. Our boards of health might be given the power, and be so constituted that a certificate of qualification from them would be of advantage to both the possessor and the public. I should say that if the latter course was adopted, that there should be three grades or classes, the third or lowest given to such men who could pass a verbal examination in the mere handicraft of their business; the second such as, combined with the former, could pass a similar examination, giving the reasons for their practice; and the first, or highest, to such men as could pass an examination giving answers in writing to such questions as might be considered necessary, and also draw an intelligable plan and write a specification suitable for the work of any first class building. The latter, or first class men, should also be required to pass a matriculation examination, showing that they were possessed of an ordinary education; provisions would, of course, be made to allow men having third or second class certificates to qualify at any time for their post. It is not mere hand-skill that is required; honesty. address, appearance, a knowledge of human nature, are also required in the man who is to win the confidence of the public, and a higher standard of recruits, to use a military expression, is absolutely necessary.

If, Mr. Editor, you think my views worthy of publication, I may at a future time recur to the subject, going more fully into my reasons and views, and giving my ideas of the qualifications required in a first class plumber.

J. W. HUGHES, *Practical Plumber, sometimes Practical Sanitarian.*

64 CRESCENT ST, MONTREAL.

IS THE MAIN DRAIN TRAP LIABLE TO SYPHONAGE?

NEW YORK, *Feb.* 17, 1883.

To the Editor of THE SANITARY ENGINEER:

I see by the *Boston Medical and Surgical Journal* of the 15th inst. that Mr. Ernest W. Bowditch, in a paper on trap syphonage, read before the Suffolk Medical Society, has stated that—

"The cause of the unsafe condition of the sewer is the fact that the sole obstacle to the entrance of gas into the house fixtures usually consists of a so-called 'running trap,' which is supposed to effectually seal the pipe between the house and the main sewer or cesspool. The fact, however, is that the flow of water through the drain, particularly if a considerable quantity be discharged suddenly, tends to empty the trap by means of the suction produced by its passage through the farther portions of the drain, and thus an unobstructed channel is at once opened between the sewers and the dwellings connected with them."

This is a most important matter, for as at present plumbed it is safe to say not one house in a thousand has a vent against syphonage on its main drain trap, for it has been taken for granted that the size of this trap (four inches and upwards), together with the fact that the house drain outside the trap is practically horizontal and not often less than six inches in diameter, and therefore difficult to fill, rendered the risk of syphonage so small that it could be disregarded. If Mr. Bowditch's statement is true then the vast majority of the best plumbed houses in this and all other cities are as unprotected against the sewer, as a bath or basin is with its trap not vented. It seems to be a point on which you might state your opinion. W.

[Our opinion is that the statement quoted by you and the inference you draw therefrom, takes an extreme view of the case. The flow through the main trap is not often so rapid as to produce the syphonage referred to, and when it does occur not many minutes usually elapse before sufficient water drains into the trap to restore the seal. We do not consider this possible contingency any cause for alarm, though we do not like what is called a running trap in such a situation, but prefer the form in which the flow line of the house drain is above the seal of the trap. See page 61–81 of Vol. V. of this journal.]

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Correspondence.

WARMING CHURCHES.

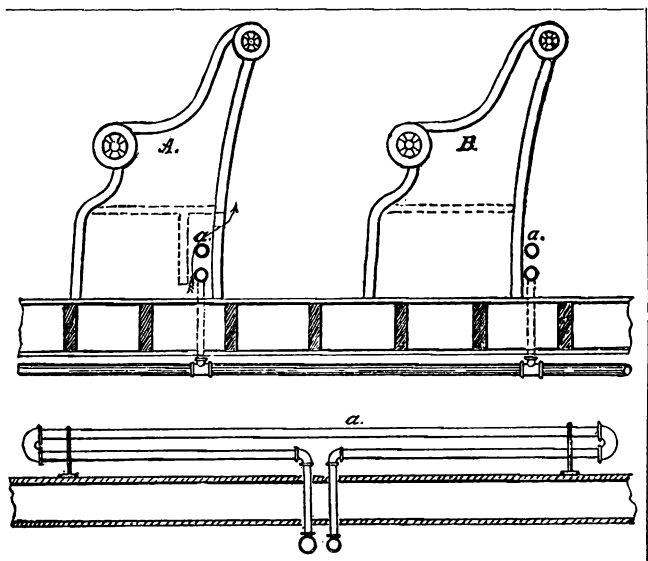
NEW YORK, *Jan*, 25, 1883.

To the Editor of THE SANITARY ENGINEER:

In the matter of supplying *direct radiation* to churches, I would inquire what you think of placing a coil in each pew? Of course I do not lose sight of the necessity of the ventilating shaft, or some other method of moving air, with a good proportion of indirect radiation for warming the supply of fresh air, but it does seem to me that a coil might be placed near the floor, and directly in the rear of each seat, so as to be at the feet of the people in the next seat behind, or under the seats, provided they are so constructed that the heat will not pass up in front of the seat under which the coil is, but to the pew *behind* the coil. Fearing I cannot make myself well enough understood, I send you the enclosed sketch.

These little coils, *a*, will connect with the steam and return main below the floor in nearly the usual way of large coils, without valves; but to avoid long return connections, I think the main return pipe can be as well carried along side of the main steam, as shown, than on the floor, as the basement is generally fitted for a class-room or chapel.

What do you think of the plan generally, and will



not the warming of the room from below rather than from above be advantageous in this case, as it will allow each person to have a "foot warmer," so to say; and cannot a church be made more comfortable, even with a lower temperature, than by most other methods?

A shows one way, with a hanging partition, so the heat cannot pass front. *B* shows it with the coil in the pew, and for those who kneel, the stool can be made to cover it, if required. Very respectfully yours, ENG.

We believe the First Baptist Church of Detroit is done somewhat in this way; at least, every pew has its coil. The plan is not new though uncommon, and suggests several interesting questions, on which we would like the views of our readers.

The problem of church warming is very unsettled. Churches can be made warm even to be disagreeable at parts, and be uncomfortably cold at the same time in other positions, and this happens with nearly all our present methods, as no one rule can be made to suit all local conditions and styles of architecture. If pews run to the floor, the *counter current*, which must always set in, sweeping to an outlet or a radiator with indirect radiation in the one case, and direct radiators set at isolated positions along the walls, in the other, will be interrupted, and will have to pass through the aisles, or on a line near the top of the pews—which should be the *neutral line*. On the other hand, when the pews *do not* run to the floor the return current is at the floor, and *over one's feet*. A person sitting in a pew which runs to the floor, and is furnished with a door, with no heating source within it, with the pew in front of a window, will always be cold (in cold weather). The cold air will fall from the glass and settle in the pew, and will have to overflow to get out, leaving the pew always full of the air of the temperature at which it falls into the pew, and not of the temperature of the body of the church, the occupant being immersed to the middle in air much colder than the rest of the house. The same thing is experienced, though in a less degree, with the pews which abut on the piers between the windows.]

LINING TANKS WITH TINNED COPPER.

LITTLE ROCK, ARK., *Jan.* 15, 1883.

TO THE EDITOR OF *The Sanitary Engineer:*

I would like to see some directions in your columns about lining tanks with tinned copper, and the methods of soldering. A. M.

[The size of the tank and sheets of copper at hand determines the method of lining.

Sheets of tinned copper usually kept in stock are 16" x 34", 24" x 48", 36" x 72", 48" x 72", etc.

A tank such as is usually used to supply a water closet, should be made to suit the copper in order to prevent waste.

One sheet 16" x 34" and one 24" x 48", will line a tank 23" long; 16" deep and 15" wide.

Take the small sheet and cut it in two, making two sheets 16" x 17" for the ends; turn up two long sides and one short end ½ inch; set and tack them in place; turn down the top edge and tack it. When the two ends are in place mark off the large sheet for the sides and bottom. Then turn clear back half an inch of the two long edges which make the end corners; then turn up the two sides and set and dress in place.

Use the ordinary tinners' solder and copper iron, with fine powdered, clean rosin.

It is well to have all tanks made to suit the copper; when this cannot be done and the tank is a large one (required to be lined in place,) procure the most desirable sheets (if you are not able to get them rolled to suit), lock-seam the bottom and put it in place and solder it; then get out the sides and ends to make one entire piece, if practicable; seam and solder them together on the floor; roll up and unroll in place. It is desirable to have only one upright seam to wipe.

If the copper will admit of it, it is much better to turn up the sides and ends, say about four or five inches, to let them project on the bottom, turning under the edge as described for the small tank. In this way it is much easier to solder, than it would be in the corner. If this can be done, the bottom can be put in to suit the sides and ends]

SIZE OF HOUSE DRAIN.

CHARLESTON, W. VA., *Jan.* 31, 1883.

To the Editor of THE SANITARY ENGINEER:

I have a few questions to ask you in regard to draining a block of buildings which I show on plan on the other side. There is no sewer in the street. I want to put in an 18-in. tile sewer at the back of the buildings, ¼-in. fall to the foot, to drain the cellars and take the water from the roof, also several water closets. I give you the size of block, which is about 280 x 100 feet, the area point just inside wall. I would like to put in some kind of a back water trap to keep from flooding the cellars in case of high water in river. Any information you can give me I will be glad to get, as I take THE SANITARY ENGINEER for authority on all of my work. Do you think the sewer is large enough to do the work it has to do? Hoping to get as early an answer as possible, I remain

Yours respectfully, FRANK FERGUSON.

[Assuming a fall of ¼-in. per foot, an 8-in. pipe running full would carry all the roof water from a heavy rain storm besides the sewage of the block given. Consequently 18-in. would be too large, and we think a 10-in. pipe sufficient; a 12-in. would be ample beyond any question.

Dealers in plumbers' supplies sell a sewer valve which is fitted to the end of the house drain, and usually hangs open, but when the tide or any back water rises, closes to prevent its admission into the drain.]

BLEEDING GRAVITY APPARATUS.

SPRINGFIELD, *Jan.* 23, 1883.

To the Editor of THE SANITARY ENGINEER:

I work for a steam fitting house that does considerable work on the gravity or return principle. It frequently happens that we have to warm a basement room, or sometimes a whole basement, especially in business buildings. The practice has been to put radiators on the floor of the basement (which is below the water line), and carry a separate return back to a tank in the boiler room, when there is one, or to the sewer when there is no place else to run it. Is this right, and if it is not right will you suggest a better way, and oblige a reader?

Yours respectfully,

KING.

[You do not say whether your employer uses a trap on the end of the return pipe for the basement, but we presume he does. Your practice is not good, and we are sorry to say there are men in the business who do just this very thing, and control, or attempt to control, the waste of water or steam by a simple valve only. The water from these radiators, or from any radiator or heater below the water line, can be collected in a small receiver, of from five to ten galls. capacity, through the separate return pipe, and automatically pumped into the boiler by a Pratt & Whitney, or an Albany trap.

When water is drawn away from a system through pipes (or traps) as you mention, the amount drawn is an unknown quantity, and with imperfect traps may be very large; but aside from the loss of heat, there are two other things to be considered, namely, the chance of getting low water in the boiler, in a very much shorter time, and the injury done to the boiler if you have to feed bad water; putting it on the same footing as a boiler which has to supply steam for an engine.

Sometimes the hot return water from a rising line is passed through a coil in a basement, to warm one room, and we think the condensed water from five or six radiators on a line above, should warm one basement room, of about the same capacity as one of the six rooms above it, assuming all to be about the same size.]

COVERING FOR WATER PIPES.

To the Editor of THE SANITARY ENGINEER:

What do you consider the best material for keeping lead pipes from freezing? How is mineral wool?

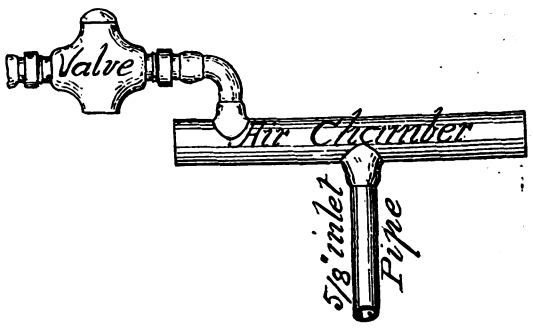
Yours, W. LANIER,
NEWARK, N. J. *Plumber.*

[In our issue of April 27, 1882, page 454, we suggested mineral wool as a good covering for the purpose indicated. We know of nothing better.]

SUPPLY TO WATER CLOSETS.

To the Editor of THE SANITARY ENGINEER:

Will you please give me your opinion of this plan for an air chamber on supply to water closets, and oblige, B.



[This will propably relieve the water hammer until the water has absorbed the air in the air chamber. If it is necessary to rely on air chambers in such a situation, some means should be provided for replenishing the air. It will be understood that we do not endorse such a direct supply to a water closet as this sketch implies.]

MONTREAL, *February* 12, 1883

To the Editor of THE SANITARY ENGINEER:

I have read with profit and interest the many articles you have published on boiler circulations, the last being the communication of "Chas. S. Hasting" (Feb. 8). The circulation below the boiler as there mentioned acts in accordance with known laws controlling the circulation of water in pipes. In this connection I think if you would publish extracts from a "Practical Treatise on Warming Buildings," etc., by Chas. Hood, fifth edition E. & F. N. Spon, Chapt. 11, with cuts, and such explanations as would make the practical application of the rules to the plumbing department clear, it would do much to make the question fully understood. Your correspondent's idea of heating his conservatory by hot water from coil in connection with a Boynton furnace is an old one here. We have a system of heating in common use which we call "combination," being a combination for hot air for heating the ground flats and a system of pipes heated by a coil in a furnace, or a cast or wrought iron heater in connection with same for warming upper floors, small conservatory or rooms at a distance not easily reached by hot air. There are hundreds of such apparatus in use in this city where I believe it was first introduced, the writer being one of the first who worked to bring the plan to a practical use.

J. W. HUGHES.

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THE NATIONAL BOARD OF HEALTH AND CONGRESS.

During the discussion of the Sundry Civil Appropriations Bill in the House of Representatives, the 20th ult., on an amendment by Mr. Manning that the $100,000 to be expended in case of epidemic, should be expended under supervision of the National Board of Health, his remarks being:

MR. MANNING. It is not my purpose to speak at any length in support of this amendment, because it has been discussed on several occasions and in several Congresses so thoroughly that every gentleman must recognize the importance of this Board and its qualifications to discharge the duties imposed upon it by law, and the incalculably valuable service it has rendered.

There is one place in the country particularly that is unfriendly to the National Board of Health. Some acrimonious feeling exists in that place toward certain members of the National Board of Health. But I have never seen nor do I expect to see any well-grounded charge against the integrity or the capacity of either the president or any prominent member of that Board. Being competent, having had experience, it is important in my judgment that they shall supervise the expenditure of this appropriation.

Mr. Ellis, of Louisiana, hostile to the Board, said:

MR. ELLIS. I regret very much that this debate has arisen, for I shall be forced to say some things that I had rather would remain unsaid.

In my judgment the National Board of Health is the most stupendous national humbug that was ever incorporated or was ever sustained by any government. If there is any one place in this country that ought to grasp at any means or agency for protecting and preserving the public health, it is the city which I represent here. Nearly always the first attacked, always the one to bear the brunt of these epidemics, it is particularly the place above all others that should most desire that proper means be adopted for maintaining the public health. For these epidemics have made her history pathetic with sorrow, have paralyzed her commerce, have thrown over her semi-tropic beauty the odor of the pest-house, and have retarded her swift march to the acme of commercial and social supremacy. And in the light of reflections like these, and stimulated by the terrible memories of 1878, I voted for the law creating the National Board of Health. Yet, I regret to say, that from documents in my possession, taken from their own books, it is demonstrated that they are not only incapable of dealing with the problem submitted to them, but they have fritterd away the public moneys appropriated for them, in some instances, it seems to me, uselessly and foolishly, not to say extravagantly. It is a source of regret to me that I am obliged to give to the public records facts such as are before me.

For instance, they were appointed and constituted a board for the purpose of preventing the introduction and spread of epidemic diseases in this country. I have here a record taken from their own books showing how they have expended some of the public money placed at their disposal.

They have been paying a lot of doctors out of the public moneys, for the purpose of compensating them for writing essays. Here is a record of two essays, one written by Dr. T. S. Verdi, of this city, a member of the National Board of Health; another written by Dr. James Law, Professor of Cornell University. Those two gentlemen were paid $300 each for two essays. On what subject? On any epidemic disease? On the small-pox, on the yellow fever, or any disease that threatens the public weal? No, sir! Essays on diseases of animals. What have they to do with the diseases of any animal, except of the animal—man?

Here is another doctor who was paid $500 for an essay upon diphtheria, a disease which occasionally prevails all over this country everywhere, and can in no sense be denominated a foreign disease and brought into this country.

Another, Dr. Kedzie, is paid $300 for an article on food and drug adulteration. Another is paid $6,000 for an essay on the pollution of the soil, and another is paid $4,000 for an essay on pollution of water. And here is another, who perhaps jaunted in the hot months over the land, who was paid $1,000 for an essay upon the summer resorts of this country. Sir, let me read these items in detail, for the country should know what goes with the public moneys. * * * * *

This bill, with its items, shows that these gentlemen have been paid somewhere in the neighborhood of $30,000 of the public money for sitting down in their offices and writing essays on various subjects.

But more: In regard to yellow fever, they have formulated the idea that all the inspection and quarantine and disinfection of all the commerce of the Gulf should be concentrated and performed at Ship Island, in the Mississippi Sound. What have they done at Ship Island? They have erected two very ordinary board buildings, which at the outside, as I am informed, could not have cost more than $6,000 or $8,000 all told. By their own report, they have inspected in the last two years nine vessels, and they present to the Government a bill of $65,000.

Mark it, sir; they have expended $65,000 at Ship Island, and yet in the year they have inspected but nine vessels, which foots up the nice little item of about $7,000 for the inspection of each vessel.

I hold in my hand the report of the National Board of Health for the past year. Let me read a few lines to see what they have been doing. I read from page 4:

Among other results fairly deducible from these various experiments the following may be cited:

1. Clear proof that loss of organic matter does occur during the evaporation of water prior to combustion of the residue by Frankland's method, contrary to what has always been claimed by Frankland.

2. Evidence of a source of serious error in the determination of nitrogen by the same process, there being a notable gain of nitrogen from the atmosphere.

3. Much fuller information than has hitherto been obtained as to the extent to which definite substances belonging to various chemical classes, and including some of the known products of putrefaction, are attacked by potassium permangranate in acid and in alkaline solution.

4. An extended comparison of the practical results of the Frankland, Tidy, and Wanklyn processes, as applied to a series of waters from known sources and of known sanitary (or insanitary) character, also to waters artificially polluted with sundry forms of manufacturing refuse, and with forms of organic matter liable to be encountered in connection with ordinary water supply.

5. Proof of the error of the statement by Wanklyn that urea is not decomposed by treatment with alkaline permanganate in such a way as to yield so-called "albuminoid ammonia."

6. Results of the exhaustion or continued treatment of organic matter by the Wanklyn and Tidy methods.

7. Results of biographical experiments (subcutaneous injection of rabbits) with waters examined simultaneously by chemical processes.

"Now listen, all ye gods!" In the heavy slumbrous air of the tropics the Angel of Pestilence is hovering with lungs breathing poison and outstretched wings from which death drops, preparing to swoop with the death instinct of the vulture and the fierceness of the condor upon the Southern coast. Cities grow pale and the land cowers with dread, and men cry for help from the threatened death. Where, then, is the National Board of Health? Gathered about a table, that distinguished body is engaged in inspecting a certain kind of water under the skin of a rabbit, just to see how the rabbit will like it, and how the health of the rabbit will be effected by it. [Great laughter and applause.] Was there ever such a spectacle! But again, sir, I charge that there was a deliberate attempt on the part of certain members of the National Board of Health to create the belief that yellow fever prevailed at New Orleans at a time when that city was in perfect health.

* * * * * *

Again, sir, I charge upon this National Board of Health the inauguration of an inspection system as odious as it was useless. New Orleans was free from fever; as healthy as any European or American city. There was not a single case of yellow fever; and yet an officer was established at the railroad depots, and if a citizen wished to go into Mississippi he was obliged to pay this officer an inspection fee for a health certificate. He did not feel a pulse, examine a tongue, inquire where you had been—all he wanted was your name and your fee and the certificate was furnished authorizing you to travel into the State of Mississippi. Was ever such nonsense and folly?

[Here the hammer fell.]

MR. DUNN. I move to strike out the last word. Now, Mr. Chairman, I am not a special champion of the National Board of Health; I am not personally acquainted with any member of that board, but I do know some things which perhaps the House had better know before it acts on this matter. The gentleman from Louisiana (Mr. Ellis) has only given voice to the hostile sentiments of the Louisiana State Board of Health.

MR. ELLIS. I beg the gentleman's pardon.

MR. DUNN. Or the New Orleans Board of Health, or both.

MR. ELLIS. I give my voice——

MR. DUNN. I do not yield to the gentleman from Louisiana. He has given some few instances to which he points as suspicious, in which the National Board of Health since 1878 and 1879 has failed to disinfect vessels.

He says if any place on the face of the earth should be profoundly interested in measures to prevent the introduction of that terrible pestilence, yellow fever, New Orleans is that place. Now, has New Orleans been watchful in that respect? That they would be interested in measures to keep it out of New Orleans is unquestioned and undoubted.

But after that terrible pestilence has gotten into that city, where it always finds a ready *nidus*, their State and city boards of health have not been prompt to sound the alarm and give warning to neighboring States and cities. In the past we have been always long kept "upon the ragged edge of apprehension" by rumors of the prevalence of pestilence and official denials until that dread pestilence finally becomes epidemic and can no longer be concealed.

The neighboring States around Louisiana—States having commerce with that city—have learned that the Louisiana State Board of Health serves the commerce of New Orleans, and, as all now believe, conceals the existence of pestilence in that city. In 1878 did your State Board of Health alarm the country and tell us yellow fever was there in May and June?

MR. ELLIS. Yes, sir.

MR. DUNN. No, sir; it was denied until it had spread abroad. It was declared epidemic in Memphis before it was in New Orleans, and yet it was carried from New Orleans to Memphis.

Did you prevent it from going out on the railroads and steamboats like infernal machines spreading pestilence upon every avenue of communication?

MR. ELLIS. We gave warning.

MR. DUNN. Until the whole country fell a victim to that terrible pestilence and was devoured as with a consuming fire?

The people believe that your State Board of Health, serving the commerce of New Orleans, is willing to peddle death to this country in order to keep up its commerce, and it has done it. And those surrounding States will not trust it because they have learned from terrible experience that they cannot do so.

They believe in the conservatism of the National Board of Health, which cannot be brought under the influence of the commerce of New Orleans or of any other city. They believe in a power lodged somewhere by this Government that rises above those influences and can give the pledge of this nation for some measure of protection.

Last year we were assured that it should be given to the Marine Hospital Service. It has not been done. They made an appropriation and placed it at the disposition of the President. I do not know what agencies the President will employ. I do not know what measures he may take. If there are any within his reach it is very well. I do not care whether you preserve your National Board of Health or your Marine Hospital Service, but in God's name give the country some measure of protection, some authority clothed with ample power to give it assurance of protection. Do not leave the country at the mercy of merchants and traders who will peddle death and pestilence for gain. What we want, what the interest of humanity demands is some guarantee against the introduction and spread of pestilence. We have commercial relations with the tropical countries where yellow fever always prevails, and hence we are annually threatened. We should have some permanent organization with power and means to keep out pestilence. The President is not at all likely to act until it reaches our country and finds lodgement somewhere.

[Here the hammer fell.]

MR. MANNING. Mr. Chairman, I have no feeling in regard to the matter. I hardly think the gentleman from Louisiana (Mr. Ellis) can claim as much. I will remark in the outset that perhaps it would be very well if there was a critical inquiry into the conduct of the State Board of Health in his State. But I will not follow that up, as it has been referred to by the gentleman from Arkansas (Mr. Dunn).

I do not care to comment on the frightful facts in the history of the yellow fever epidemic of 1878, when 100,000 people were stricken, 20,000 hurried into their graves, and more than $2,000,000 of property sacrificed each day for the whole period of the epidemic; and much of it, it is claimed, the result of the negligence of the people of New Orleans and their desire to preserve uninterrupted their business interests

Now, I want to say to the gentleman from Louisiana that I never heard before of these imputations that he has cast against Dr. Cabell and the worthy gentlemen who surrounded him upon the Board. And I must look further before I accept the statement made, which has been put into his hands doubtless by those gentlemen of New Orleans who sent forward the other day an ill-tempered pamphlet in order to prejudice Congress when it reached this clause in the bill. I remember what the gentleman from Virginia (Mr. Tucker) said of Dr. Cabell last session, and I do not believe it possible a man of such purity and intelligence would be capable even of conniving at any such shameless conduct as that which has been imputed; and until we learn more of the merits of the accusation preferred by the gentlemen from Louisiana it is just to interpose his hitherto unquestioned integrity and demand additional evidence. Good character is worth but little if it can be struck down in this manner.

But let me say, Mr. Chairman, in the gentleman's own city I might name, if it were profitable to do so, several prominent physicians who do not sympathize with the view that he expresses at all, nor the criticisms that he has made on this floor. On the contrary, if they were here to-day they would uphold our hands and plead not for passions or prejudices, but for human life against treasure. You should not put treasure in the scale upon the one hand and human life upon the other.

Mr. Manning in reply to Mr. Ellis, spoke as follows, in part:

MR. MANNING. The gentleman from Louisiana (Mr. Ellis) complains that good faith has not been shown by the National Board of Health in the discharge of its duties, with regard to epidemic diseases, the preservation of the public health, and the expenditure of public funds. He complains also that criticisms have been visited upon New Orleans by the gentleman from Arkansas (Mr. Dunn), who spoke in support of my amendment, and myself.

Now, gentlemen who live in glass houses should not be the first to throw stones. It was in reply to an imputation of the grossest bad faith that I responded this afternoon just before the House took a recess. I have no feeling about the matter more than would be aroused in any one who has an interest in human life above treasure.

I cannot be charged with going too far when I say to the gentleman from Louisiana (Mr. Ellis) that I prefer to accept the judgement pronounced in good faith and upon satisfactory evidence by the physicians of State Board of Mississippi with reference to the conduct of the State Board of Louisiana and the conduct of the people of New Orleans touching the matter in question.

I have no doubt that the people of New Orleans will compare well with the people of other portions of the country. I would not detract one particle from their

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reputation as worthy people, but they are human. Who doubts that local boards must be swayed more or less by local influences? And does not our experience demonstrate that local boards are deemed unsafe?

The State Board of Health of Louisiana gave out only a few years ago to the people of the country a statement in which they set forth that the commercial losses alone to New Orleans by interruption of intercourse with the surrounding country and the diversion of trade to other cities footed up in the aggregate $5,000,000 during a yellow fever epidemic of about four months, a million and a quarter each month; and the actual cost of the epidemic to the material resources of New Orleans exceeded $10,000,000. They were out of humor with their neighbors for establishing such a strict quarantine as to shut up the gates of New Orleans and cut off commercial intercourse with that city.

The State Board of Health of Mississsppi sent this telegram last year, when a similar bill was under consideration, to this House. I read it as contributing to the force of my statement that the National Board of Health is worthy of credit. It was addressed to the Mississippi delegation, and reads as follows:

JACKSON, MISS., *July* 24, 1882.

Senators LAMAR and GEORGE, and Representatives MULDROW, MANNING, MONEY, SINGLETON, HOOKER and LYNCH, (care J. Z. GEORGE, Washington, D. C.):

The State Board of Health, at a special session held here this day, have unanimously agreed that the National Board of Health can and will perform vital and important sanitary services that can be rendered by no other body, and would respectfully urge you, in view of the important interest involved, to do all in your power to obtain such an appropriation from Congress as may enable that Board to fully discharge its responsible duties in accordance with the plans foreshadowed in its annual report.

F. W. DANCY, *President.*
C. A. RICE.
W. F. HYER.
J. N. BENNETT.
W. D. HILL.
B. F. KETTRELL.
J. W. BLANKS.
E. P. SALE.
WIRT JOHNSON, *Secretary.*

Last year the State Board of Health of Mississippi sent a telegram to the secretary of the National Board of Health calling importunately upon that Board to establish a system of inspection of passengers and freight from New Orleans, stating distinctly that the people of the State of Mississippi could be best protected by the interposing hand of the National Board of Health, and that it was unwilling to rely on the State Board of Louisiana. * * *

I proceed to notice briefly, with such information as I have at present, the charges of maladministration against the National Board of Health, and I do so purely in the interest of justice. not being acquainted with a single member of that Board.

The first charge, as I understood it, was that $65,000 had been spent for inspecting nine vessels on the Gulf coast.

It has been stated to me that the facts are that the station at Ship Island consists of eleven buildings all for storage of cargoes, for disinfection, for sick and well, and quarters for officers and men. In addition, a wharf was constructed, a steam-tug purchased for boarding purposes, and a sloop for the use of the station, and the whole cost of construction and maintenance from its establishment to the present was $65,000—$30,000 for construction, and the rest for maintenance and caring for the passengers and crews of vessels sent there. Twenty-seven vessels were cared for during the past year, and not nine as stated.

This, it will be seen, is a wholly different account of the expenditure of the money referred to. Can the gentleman maintain his assertion?

The next charge is that $6,000 was paid for essays on pollution of soils.

The simple statement of the case as reported to me will fully vindicate the Board from either a corrupt use of public funds or desire to usurp authority.

An investigation by Prof. Raphael Pumpelly, of the United States Geological Survey, aided by Prof. Geo. A. Smyth, upon the influence of various soils upon sanitation, was ordered by the Board, pursuant to the authority conferred by the following section of the original act of 1879, establishing a national board of health.

SEC. 2. The duties of the National Board of Health shall be to obtain information upon all matters affecting the public health, to advise the several departments of the Government, the executives of the several States, and the Commissioners of the District of Columbia, on all questions submittted by them, or whenever in the opinion of the Board such advice may tend to the preservation and improvement of the public health.

This investigation was in progress for more than two years. Prof. Pumpelly was not paid at all for his services. His assistant was paid about $200 per month. The rest of the money was expended in experimental work, being cost of chemicals, instruments, rent of laboratory, etc., necessary for carrying on the work.

Of this work Dr. Frankland, the eminent professor of the National School of Science, South Kensington Museum, London, says of this paper, in a letter to the author:

I consider it to be one of the most important contributions ever made to our knowledge of the propagation of epidemic diseases.

So with all the operations and expenditures of the Board. They will bear the closest scrutiny. They are all made under the supervision of the Secretary of the Treasury.

Mr. King, of Louisiana, also replied:

I am very sorry, indeed, to have to oppose my colleague (Mr. Ellis), and to endeavor to controvert his statements before this House. He has certainly made most serious charges against the National Board of Health, an institution presided over by a gentleman against whom no one can say anything, and who has associated with him men of the very highest character. I presume that his associates are men fully his peers and his equals in integrity and in earnestness to discharge the duties imposed upon that Board.

My colleague has gone into what he calls a statement of facts relating to the expenditure of money of that Board. I would be glad if he would answer me one question, and state from whom he derived the information upon which he has made his statement here.

MR. ELLIS. From the books of the National Board of Health.

MR. KING. Did he get that statement officially?

Mr. ELLIS. They came from a member who took them from the books of the National Board of Health.

Mr. KING. Was he in charge of those books?

Mr. ELLIS. I give them upon the authority of Surgeon-General Hammond.

Mr. King here made a detailed explanation of the cost of the various investigations, a record that we much regret want of time and space forbids our publishing. In concluding, he said:

This is not a trivial matter. It is one that concerns the very life of the people south of the Potomac.

THE BROWNSVILLE QUARANTINE.

On the 11th of October last the Mayor of Pensacola, Fla. (Hon. J. M. Tarble), addressed a letter to the Mayor of Brownsville, Texas, requesting information with regard to the operations of the Marine Hospital Service in and around that city during the recent epidemic of yellow fever. The following is the correspondence:

MAYOR'S OFFICE, PENSACOLA, FLA., *Oct.* 11, 1882.

HON. MAYOR, BROWNSVILLE, TEXAS.

Sir:—For the information of the public of this city will you kindly give us the benefit of the experience of your city with yellow fever and the results obtained by the cordon:

1. Was any tender of assistance to your city made by the Marine Hospital Service other than by the establishment of a cordon?

2. How long was it after the declaration of the epidemic before the cordon was completed?

3. Did the officials of the M. H. S. work in any way antagonistic to or in opposition to the local health authorities?

4. Was pecuniary aid given in any way by the government save in connection with the cordon?

5. What was the nature of the aid given to refugees within the cordon lines? State please, if provisions, medicines and attention were given them.

6. Please state as near as possible the number of people who were removed from the city through the efforts of the authorities, also what disposition was made of them.

7. After the expiration of the allotted period of quarantine, were refugees permitted to pass through the outer cordon into the State?

8. Was contagion carried to any other cities by such refugees as were released from the cordon quarantine?

9. Who were appointed as cordon guards and officials, Democrats or Republicans? Do you think politics effected such choice and appointments?

10. By what officers was the money for the disbursement of cordon distributed?

11. Was there any just suspicion that the funds were used for political ends? If so what evidence of it?

12. Did the disease spread within the two lines of cordon in the camps to any extent?

13. Did the establishment of the cordon remove the expense of quarantine against Brownsville by other cities, or did it reduce such expense?

14. What is your opinion of the efficiency of the cordon?

15. Do you think that its establishment was wise?

16. Do you think that the effects of the cordon had anything to do with the stamping out of the fever?

17. Do you think that without the cordon and its influence the plague of yellow fever would have been any more severe?

I am doubtless putting you to some trouble to answer these questions, but you will greatly oblige by so doing, at your earliest convenience.

Very respectfully yours,

(Signed.) J. M. TARBLE,
Mayor of Pensacola, Fla.

OFFICE OF THOS. CARSON, MAYOR,
BROWNSVILLE, TEXAS, *Nov.* 14, 1882.

HON. J. M. TARBLE, *Mayor of Pensacola, Fla.*,

Sir:—The quarantine which has been maintained against this place since the 29th of July, 1882, prevented an earlier acknowledgement of your letter of Oct. 11, in which you ask me to give you the experience of our city with yellow fever and the results obtained by the Cordon. The further enquiries in your letter which I have endeavored to answer catigorically, as per enclosed herewith, disclose a desire to ascertain how far we were benefited by the action of the Marine Hospital Department in relation to the epidemic. From my answers to your questions you will readily perceive that, in my opinion, this community received no benefit from that institution other than that involved in the employment of some thirty persons (who would probably otherwise have been idle) as quarantine or cordon guards, and in the personal services of three of the physicians who accompanied Dr. Murray to Brownsville as assistants. For a short period after his arrival Dr. Murray's personal service, as a physician attending the sick, was also of great value; but on the establishment of his cordon, his entire time appeared to be occupied by matters in connection with that duty.

As an offset to those benefits and advantages, we had the arbitrary assumption of control of quarantine matters by Dr. Murray, and his attempt to override the local health authorities, the inconvenience of the useless restrictions imposed by the cordon, and the injury caused by that institution, when, as our election day approached, it drifted into a mere political machine, and was used for the purpose of facilitating the election interest of candidates, supported by the Custom House of this district. Two days after the election it was disbanded; on election day sixteen of its members were interested as candidates or occupied as supervisors of election and deputy marshals, and the remainder as runners or supporters, all, however, on the same site. Yours truly,

(Signed) THOMAS CARSON.

Answer No. 1.—No tender of assistance was made to our city by the Marine Hospital Service. In response to our application to the Secretary of the Treasury, and after considerable telegraphic correspondence (copies herewith marked *a*), Dr. Murray, of that service, and three assistant physicians were sent here, bringing, also, one female and six male persons as nurses. Dr. Murray also brought some medicines and hospital supplies, the former consisting chiefly of some 300 ounce bottles of pulverized charcoal, but no quinine, except a small supply of three to five grain pills. He also brought as fumigatory material, eight barrels of copperas, five barrels roll sulphur, and two barrels diluted carbolic acid.

The hospital supplies were mainly a dozen boxes of lemons, two dozen champaigne, and four boxes of other wines and liquors. The mustard he brought was found to be damaged and worthless. He brought, also, two small hospital tents, capable of containing six cots each, twelve cots, but no beds, mattresses, nor bed clothing.

Previous to the arrival of this Marine Hospital contingent our Citizens' Relief Committee had established a hospital in a large brick, two-story building, used for school purposes and generously placed at the disposal of the committee by its owners, the Catholic clergymen of this city. This building, known as St. Joseph College, the committee had fitted up with twenty-four beds, had provided it with a matron and nurses, and placed it in charge of one of our local physicians, assisted by all the medical men of the city as required. At the time of Dr. Murray's arrival it contained fourteen yellow fever patients. Dr. Murray stated to the Relief Committee his williness and desire to take charge of *all* the sick, leaving the committee to provide only for the destitute. On this the hospital was turned over to him with all its appliances. He discharged the nurses and replaced them with those he brought. Before the second day it was found his nurses were chiefly a lot of drunken rowdies, picked up, apparently, at hap-hazard in Galveston, and their treatment of the sick was such that the Mexican people, who had commenced to appreciate the advantages afforded by the hospital, and were beginning to avail themselves of its comforts, became alarmed, and would not permit their sick to be sent their. The result was, that in a building capable of accommodating two hundred sick, there were never more than twenty-four patients while the Marine Hospital people had charge of it, and during most of that period there was an average of over six hundred yellow fever cases in the town.

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Instead of taking charge of all the sick, as Dr. Murray stated his williness and ability to do on his arrival, as well as supply all needed medicines, he announced three or four days after he came here that he could only attend to and provide medicines for those in the hospital, or about 3 per cent. of the people under treatment. This was after his Galveston nurses had made the hospital a place of terror to the sick poor. On this I, as Mayor, wired the Surgeon-General, as per telegram annexed marked *B*, and to which, to this day, I have received no reply. But we saw that we could not rely on the Marine Hospital Department for any relief for our stricken people, and we authorized the Governor of Texas to state our case to our fellow countrymen. Their noble response from all quarters of the Union enabled the Relief Committee to save—I do not hesitate to say—hundreds of lives; not alone from the jaws of the pestilence, but from the not less deadly menace of hunger and starvation.

These are the simple facts in the case, and you can gather from them the value of the service of the Marine Hospital Department to the afflicted people of Brownsville in their recent trial.

Answer No. 2—On the 29th of July we declared quarantine against Matamoras, Mexico. On the 4th of August the disease was declared epidemic in Brownsville.

The main hospital contingent arrived in Brownsville on the 28th of August, and Dr. Murray organized his cordon about the 3d of September, thirty days after the disease had been declared epidemic here.

Answer No. 3.—From small beginnings, which were overlooked because of the attention of the officials being engrossed in caring for the sick and destitute, Dr. Murray gradually assumed supreme and exclusive control in quarantine matters. Citizens were required to have his passport to enable them to leave the country for Mexico, and were prohibited coming back at all; no provision was made by him for keeping persons in quarantine or isolation, he simply declared non-intercourse, and when the local authorities sought to mend the situation, he scouted their authority, threatened to bring United States troops to sustain his pretentions.

Driven from this position he practically retired from the town, but continued to exercise despotic authority on the line of this cordon.

Answer No. 4.—In no way save as indicated in my answer to your first question.

Answer No. 5.—There were no refuges within the lines of cordon established by Dr. Murray. A person desiring to go outside the line of the cordon proceeded on his journey the usual way. If he met a cordon guard he was informed he could not go further unless he remained at one of two designated points (about thirty miles apart), for ten days. At each of these two points a house was provided, but no provisions or anything but mere shelter. So far as I can learn about six person availed themselves of those provisions to get through the cordon during the entire period of its existence—say from Sept. 3d to Nov. 9th.

Answer No. 6.—No people were removed from the city by the cordon authorities; nearly all the people who desired to leave town did so within a week or two after the disease was declared epidemic. Some of them went into voluntary quarantine in order to pass into other counties.

Answer No. 7.—Yes, in the six cases, more or less, referred to in my answer to 5th question.

Answer No. 8.—There is no record that the disease was carried anywhere else from Brownsville by parties leaving this town, either before or after the establishment of the cordon. The disease spread among the adjacent ranches (say within fourteen to fifteen miles) but was rarely fatal among them.

Answer No. 9.—Young men, principally of Brownsville, nearly all "floaters," as regards political faith at the time of appointment. I don't think Dr. Murray had any view of their politics, but they were named by the Deputy Collector of Customs, the leader of the Ochiltree movement here, and the cordon guards to a man supported Ochiltree, the Republican candidate.

Answer No. 10.—The guards are not yet paid. The money, I understand, comes to the Collector of Customs, after receipted pay rolls are forwarded.

Answer No. 11.—As to this question you must conclude from foregoing answers. Republican canvassers could pass the cordon guards with little or no detention. Democratic ones could not.

Answer No. 12.—Question not clearly understood. There were no camps except that of the troops from Fort Brown.

There was, for a time, a line of cordon guards on the river, to prevent people crossing from Mexico. Those were withdrawn about Oct. 31, and placed on the line of the Arrozo, Colorado, about thirty miles north of Brownsville. There was another line of cordon one hundred and forty miles north of the Arrozo, Colorado. I have heard of very little disease between or beyond those lines. Not over a dozen cases.

Answer No. 13.—Not a dollar; it had no effect whatever.

Answer No. 14.—The line guarded in this country was in all about seventy miles long, and there were twenty-eight guards on it. Most of them knew nothing of the topography of the country. From this fact you can judge of its efficiency in preventing parties passing beyond it.

Only the few people (the half-dozen before referred to) who were well-known and could not conceal their identity or whence they came when beyond the lines, troubled themselves about the cordon in passing out.

Answer No. 15.—No; the money it cost could have been more usefully applied.

Answer No. 16.—In my opinion, and from close observation of its working, not even in a remote degree.

Ansuer No. 17.—It had no effect in yellow fever locality, and I am most thoroughly convinced had nothing to do with its spreading and limitation.

INSTRUCTING A PLUMBING CLASS.

For all who are concerned about the practical instruction of plumbers the list of questions which we reprint below from the course of the New York Trade Schools, will be of interest. Slips containing these questions are prepared and distributed among the young men attending the school. The instructor then bases his remarks upon them, using a black board to write the questions on and their answers, while he, at the same time, gives such explanations to the class as may be neccessary to make the answers entirely clear. In this way it is sought to fix the instruction in the minds of the scholars as it could not otherwise be. The questions on this slip referred to boilers.

1. Of what metals are boilers usually made?
2. How much should a copper 40-gallon boiler weigh?
3. How much should one of 60 gallons weigh?
4. How much should one of iron weigh for 40 gallons?
5. How much if 60 gallons?
6. How are they usually placed?
7. Is it of any consequence where they are placed?
8. Where should cold water supply pipe enter boiler?
9. How should circulating pipes between boiler and water-back be arranged?
10. Is there any advantage in having hot circulating pipe larger than the cold one?
11. What causes the rumbling sound in boilers?
12. What is the usual cause of explosion in a water-back?
13. When the water in a boiler is generating steam rapidly, what effect may drawing off the hot water have?
14. Why does this condensation of steam endanger a boiler?
15. What is the pressure of the atmosphere?
16. Is a collapse more likely to happen when the water pressure is light?
17. What is the usual safeguard against explosion of a boiler?
18. Can the hot water service pipe be used in this way?
19. Are wrought iron boilers stronger than copper, and why are they used?
20. What cold water pressure will the average copper boiler stand?
21. What is likely to be the greatest heat of the water in a 40-gallon boiler in an average plumbed three-story house, with the hot service pipe returned to the boiler to keep a circulation through the pipes?
22. What is the heat of steam?
23. What is superheated steam?
24. Does this change its nature?
25. Is there any possibility of steam in the boiler of a dwelling house becoming superheated?
26. Do boilers get dirty—and why?
27. Does the drain cock at the bottom cleanse them?
28. What plan can be adopted to do so?
29. How does this act?
30. Can water tanks in any part of the house be connected with water-back instead of having a boiler?
31. Is it necessary to cover such tanks and have an escape pipe for steam?
32. Copper boilers have a tinned copper cold water pipe in them; is any precaution advisable in regard to this pipe?
33. What is the object of this?
34. Is there any objection to placing a stop cock between boiler and water-back?
35. What is the object of a double boiler?
36. What is gained by this?
37. Is it necessary to connect both boilers with water-back?
38. If the water from inner boiler is drawn off, what danger is incurred?
39. Can the return pipe be taken below the boiler?
40. Is there any objections to having the water pass through the water-back of two ranges?
41. Which is best for the pipe between boiler and water-back, lead or iron, and why?
42. What is the best size?
43. What ill effect comes of putting the upper pipe from water-back into the boiler at a point lower than water-back?

1. *Make a diagram of kitchen boiler, connected with water-back.*
2. *Make diagram of a slung boiler.*
3. *Make a diagram connecting one boiler with two ranges.*
4. *Make diagram of a double boiler contected with range.*

AN INVESTIGATION DEMANDED.

DEPT. OF PUBLIC WORKS, COMMISSIONER'S OFFICE,
No. 31 CHAMBERS ST., NEW YORK, *Jan.* 31, 1883.

HON. FRANKLIN EDSON, *Mayor*:

SIR: From the newspaper reports of the proceedings of the Committee which you have associated with yourself, under a recent resolution of the State Senate, to inquire into the subject of providing an additional water supply for the city, I find that one of the witnesses, a Mr. James E. Sewell, Civil Engineer, or Surveyor, submitted certain questions and made certain statements regarding the depth and flow of water in the Croton Aqueduct (which are matters of continuous public record in this department), from which he appears to draw the conclusion and make the charge that the water supply is so manipulated as to withhold a considerable quantity of the water, which might otherwise be delivered in the city through the aqueduct.

The charge or imputation that the department is purposely withholding or wasting a portion of the available water supply is so unfounded and absurd that on first thought I did not intend to notice it. On further reflection, however, considering the gravity of the accusation, the publicity which has been given to it, and the erroneous impression which it might create with some people not acquainted with the circumstances, I have come to the conclusion to address this letter to you, requesting you and the Committee to make the fullest inquiry to establish in an important and authoritative manner the true facts in this matter. And, in making this request, I place at the disposal of yourself and the Committee all the records, maps, and information in the possession of the department, and all the aid which the department engineers can render to facilitate the inquiry, suggesting, at the same time, that a personal examination of the aqueduct and reservoir by yourself and the Committee would be the surest method to ascertain such facts.

Asking early action on this request, I am,

Very respectfully,

Signed HUBERT O. THOMPSON,
Commissioner of Public Works.

"A prominent gentleman of the Fourth Ward" of Syracuse, N. Y., who was interviewed by a reporter lately, seems to be a sensible man. Onondaga Creek, which flows through the city, receives all refuse and sewage. Consequently it is nasty and not unlike the Nepperban at Yonkers. The gentleman referred to, when asked what he thought would have to be done about it, replied:

"Some persons have proposed to plank the bottom of the creek, some to wall up its sides, some to arch it over with stone; but all these plans have been abandoned as not furnishing an adequate remedy. Although I am not a civil engineer, I have given this subject sufficient thought to warrant me in suggesting a plan. I would have a trunk sewer built on each side of the creek, near or remote as shall be most practicable, beginning at Onondaga street and emptying into the creek below the thickly inhabited part of the city. Into these new sewers should be conducted all the sewage now flowing into the creek. In that way the waters of the creek could be kept pure, the outlets of the present sewers would not be obstructed as they now are in time of freshets, often forcing back into cellars and basements the contents of the sewers, and under the proposed system the outlets of the present sewers would be under ground. Then, too, the proposed sewers could be constructed so low that all lateral sewers would have a lower outlet, and thus a better flow, and from time to time sufficient water could be drawn into them from the creek to give them a thorough cleaning out. Of course two such sewers will cost a large sum of money, but I regard them as absolutely necessary as a sanitary measure and believe that they can't be built any too quickly."

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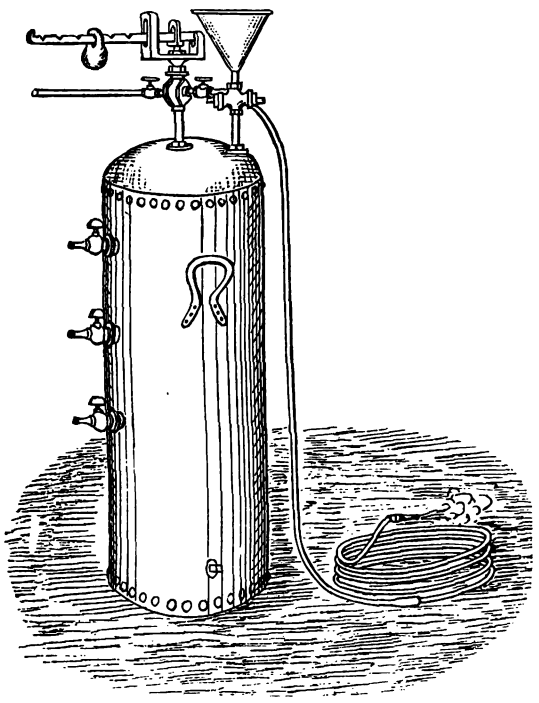
Novelties.

Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

PIPE-THAWING MACHINE.

This description was suggested by the letter of a foreign correspondent, who asks us to illustrate the device used in the United States for thawing out frozen water pipes. This apparatus, though not a "novelty" in principle, is the first we have seen in the market. Heretofore plumbers in this city have provided themselves with "steam kettles" of different patterns, though essentially the same. They are generally adapted in form to rest on a charcoal furnace such as plumbers use for melting lead, and consist simply of a chamber for the generation of steam, a pipe extending nearly to the bottom, with a funnel on top for the introduction of water, an outlet for the steam, a safety valve and gauge-cocks. The form illustrated below, as manufactured by Mr. John Trageser, of 273 Pearl street, this city, is of galvanized iron with brass fittings.



The steam is used to thaw frozen pipes by applying it directly to the ice inside by means of a smaller pipe connected with the steam chamber and moved along inside the frozen pipe as fast as the ice melts and as far as it will readily go. Three-eighths or one-half-inch lead pipe is generally used, being connected with the steam chamber by rubber tubing. The latter, stiffened by winding brass wire around it spirally, can be inserted much greater distances, but this is patented and not much used in this city. The metal pipe ordinarily used here cannot be inserted very far in pipes having many sharp curves. The frozen pipe is cut and the thawing begun anew when the steam pipe can be pushed no farther.

Construction Notes.

WELLESLEY, MASS.—At a town meeting the 15th ult., it was voted to apply to the State Legislature for an act to introduce water into the town. It has been suggested that a supply can be obtained either from Natick or Newton.

BUFFALO, N. Y.—Bids for constructing the trunk sewer were handed in February 20. They ranged from $703,303 to $1,323,572. The work was bid for in eight sections, and the sum of the lowest section bids, which will be the actual lettings, is $624,777.

EVANSTON, ILL.—The trustees of South Evanston have ordered an appropriation of $25,000 for the new water works.

HYDE PARK, ILL.—The Board of Trustees awarded, February 21, to Michael Clarkson, the contract to lay a 16-inch water main from the pumping works to Ninety-fifth street and Commercial avenue at $1.10 per lineal foot.

CHICAGO.—The County Board awarded, February 19, to Bufton & Boyd, at their bid of $10,348, the contract for improving the ventilation and sewerage in the jail and criminal court.

NEW ORLEANS.—The Board of State Engineers, the 14th inst., annulled the contract made last November with Thomas O'Malley for the construction of levees on the Atchafalaza river, and turned the work over to S. L. James. The New Orleans *Picayune* states that the work amounted to 115,000 cubic yards of embankment for which the State was to pay 27 cents per yard.

CONTRACTS AWARDED IN PHILADELPHIA.

Contracts have been awarded by the Highway Department for the construction of the following sewers:

A branch sewer on Cambria street, from D street to Rorer street. and on Rorer street from Cambria northward 250 feet, to G. H. Miller, at $2.50 per foot and $25 per man-hole.

A branch sewer on Commerce street from Rose street to the sewer in Adams street, and on Rose street from Almond street to Commerce, to W. B. McConklin, at $2.44 per foot and $25 per man-hole.

A branch sewer on Baring street from Thirty-second street westward 195 feet, to W. H. H. Achuff, at $2.43 per foot and $25 per man-hole.

Branch sewer on Washington avenue from sewer east of Front street and extending westward to west side of Front, to W. B. Conklin, at $2.33 per foot and $25 per man-hole.

Branch sewer on Twenty-second street from Chestnut to Sansom, to W. B. M. Conklin, at $2.73 per foot and $19 per man-hole.

Branch sewer on Marshall street from Venango street to Erie avenue, to W. Armstrong, at $3.65 per foot and $25 per man-hole.

Branch sewer on Mountain street from Eighth to Ninth, to W. B. M. Conklin, at $2.33 per foot and $25 per man-hole.

Main sewer on Forty-seventh street from about 150 feet north of Aspen southward 1,000 feet, more or less, to W. H. Achuff at $44.75 per foot; the latter is a continuation of the Mill Creek sewer.

WATER WORKS FOR ROSCOMMON, MICH.—A system of water works has been selected by the village board, and will be submitted to a vote of the electors at the coming village election on second Tuesday in March, and, if carried, the system will be immediately introduced. The estimate of the board of cost of these works, for fire protection and for furnishing all who may need water is $7,000. The plan is to let the contract to Flint, Walling & Co., of Indiana, to erect a large tank, capable of holding 1,100 barrels, at an elevation of 40 feet above the base, erected on an elevation, with a large windmill with a ten-foot stroke, and a pump to get the water into this tank, located close to a large stream (Robinson Creek), the stream and tank being connected by a pipe. Pipe ranging from three to six inches in diameter will be laid along the principal streets, at a depth below the surface sufficient to insure the water from frost. Hydrants will be located at every corner of a street where it is deemed necessary for protection. About 1,000 feet of hose will be bought with three hose wagons. An office will be erected for a council room, using the lower part for a hose house. As the liquor tax amounts to about $3,300 per year, it is thought this outlay can be met and liquidated from this fund, without any further tax on the people.—*Engineering News.*

OAKLAND, CAL.—An ordinance granting to J. G. Diroll and W. G. Long the right to lay water pipes in the streets, has been signed by the mayor.

GLOUCESTER, N. J.—Contracts have been awarded in the matter of the water works as follows: For subsiding reservoir to John E. Eschbach, at $5,600; for pipe system complete to John E. Eschbach, at $34,534.81; foundation of water tower to Leaming, at $2,275; Engine house to Leaming, at $5,565.97; water tower to John Baizley, at $5,870; engines to Robt. Watherill and Co., Chester Pa., $14,550; fire protection, $2,500.

WATERBURY, CT.—The Sewer Commissioners had a hearing January 26, on taking land for sewerage purposes.

CUSTOM HOUSE AND POST OFFICE AT HARTFORD, CONN.—Synopsis of bids for furnishing and setting the granite street curbing for approaches, received under advertisement of Jan. 16, 1883, and opened Jan. 26, 1883:

Mt. Waldo Granite Co	$945 00
M. H. St. John	1,100 00
Bodwell Granite Co	950 00

CUSTOM HOUSE AND POST OFFICE, HARTFORD, CONN.—Synopsis of bids for Granolithic Pavement for approaches, received under advertisement of Jan. 16, 1883, and opened Jan. 26, 1883.

M. Taylor	$2,340 00
H. L. Cranford	2,370 00
L. S. Filbert	2,425 00

BROWNWOOD, TEX.—The Commissioners' Court have ordered a sewer built from Court House Square to Pecan Bayou, a distance of two miles. Bids will be received at their next meeting.

SCHAGHTICOKE.—The President of the village, and other residents, conferred with the State Board of Health and representatives of the Boston, Hoosac Tunnel and Western Railway, at Albany the 11th ult., on abating the nuisance in the Hoosick River. The railroad agreed to undertake all the work specified by the Board of Health.

CONTRACTS AWARDED BY NEW YORK DEPARTMENTS.

The following lowest bids were received at the Department of Public Works on the 21st ult.:

For regulating and grading Tenth avenue between 93d and 95th streets, and setting curbstones and flagging sidewalks therein: Thomas Casey, $3,856.25.

For the same work on 122d street from Fourth to Madison avenue, John Rhelan, $18.139.50.

For the same work on 136th street between Sixth and Seventh avenues, Patrick Farley, $6,451.

For the same work on 141st street, between Eighth and St. Nicholas avenues, James Reilly, $4,440.50.

For flagging sidewalks, four feet wide, on Third avenue between 93d and 101st streets, J. D. Moore, $2,548.25.

For same work on Ninth avenue between 64th and 71st streets: B. Mahon, $4,257.

For laying water mains in Jerome avenue from Sedgwick avenue, 8,000 feet north, T. E. Crimmins, $24,011.

For laying water main in Alexander, Myrtle, Valentine and other avenues and streets in the northern part of the city, John Cornwell & John Cornwell, Jr., $16,755.

For furnishing cast-iron water-pipe, branches and special castings, the following bids were received:

	First lot.	*Second lot.*
Florence Iron Works	$55,410.	$57,540
Warren Foundry & Machine Co	52,770.	56,580
Theo. Sturges	55,963.50.	59,320

The Romapo Improvement Company, for the improvement of the Romapo River, in the State of New York, for manufacturing purposes, and also for furnishing, accumulating, storing, conduiting, selling and supplying water for various purposes, was incorporated Feb. 14 with a capital of $10.000,000.

A bill incoporating the Alachua Drainage and Reclamation Company, was introduced into the Florida Senate the 26th ult.

Waterbury, Conn., made $28,452.12 out of its water works last year. This amount came out of 2,217 consumers, who paid all the expenses of maintaining the works in addition. It seems pretty hard on water takers that they should be compelled to assist in the reduction of the taxes and insurance of their fellow citizens to so large an extent. The expenses of maintaining the works were $5,728.06, or about $2.58 per consumer. But in addition to this, each one paid the city $12.83 for that which all his fellow citizens shared with him—the protection to property and the comforts of a general supply of fresh, wholesome water.

The City of Indianapolis, Ind., came very near being placed in a position of great danger last week. The White River rose rapidly until the water was a foot deep on the floor of the engine house containing the pumps which supply water to the city. As the direct supply system is used there, a very slight additional rise would have cut off the water supply entirely, by extinguishing the fires under the boilers.

A resolution passed the Select Council of Philadelphia the 23d ult., authorizing the Commissioners of Fairmount Park to institute legal proceedings against all persons polluting the water of the Schuylkill above Fairmount dam, whenever they deem it necessary to do so.

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THE CHICAGO MASTER PLUMBERS.

(From our Special Correspondent.)

CHICAGO, FEB. 15.—About forty members of the Master Plumbers Association were present at the regular meeting to-night, the feature of the evening being an illustrated lecture or familiar talk on the subject of "The Circulation of Water in Range Boilers." The speaker, Mr. Creque, of Creque, Ronalds & Co., New York, was introduced by President D. J. Rock, and for three hours held the floor to the evident interest of the Association, a good part of the time answering the questions that were asked him liberally. The sense of the meeting was expressed in resolutions unanimously adopted endorsing the system of fitting up boilers advocated by Mr. Creque.

The Association offered the following advice to all householders:

"A cast-iron water-back is known by all practical plumbers as the most dangerous. When an explosion occurs it flies all to pieces, carrying death and destruction with it, while on the contrary we know of no fatal results by the bursting of wrought-iron pipe water-backs. To prevent water-back explosions, before you light the fire in the morning in your kitchen stove, apply a burning newspaper to every part of the connecting pipe between stove and boiler. Hold the blaze longer close to the boiler and stove. Repeat this several times. A spirit-lamp or hot water will serve the same purpose as burning newspaper. As a simple indicator place an open vessel of water as near the pipe connection of the water-back as possible; if ice forms in the vessel during the night do not start a fire in the kitchen stove until you apply one of the above remedies. In cold weather, if you keep a fire burning in the kitchen stove day and night, this will insure you against any damage from water-back explosions."

PLUMBING LAW VIOLATIONS.

Fifteen trivial cases of violation of the plumbing regulations were reported last week to the Health Department of this city by the plumbing inspectors, as follows: Hooper one; Eagleson and Golden two each; Elliot four, and Hollick six. One more serious case was reported by Inspector Elliot.

The American Institute of Mining Engineers elected the following officers at their meeting in Boston last week: President, Robert M. Hunt, of Troy, N. Y.; vice-presidents—two years—S. F. Emmons, of Denver, Col.; W. C. Kerr, of Washington, D. C.; S. F. Wellman, of Cleveland, O.; managers—three years—John Birkinbine, of Philadelphia, Pa.; Stuart M. Buck, of Coalburg, Western Virginia.

The imminent danger of a complete deprivation of water to which Cincinnati has been exposed, will doubtless cause renewed discussion of projects for a different source of supply. The whole question has been so befogged by counter statements of the most positive and acrimonious type, that it is not easy for an outside observer to say where or how the new water supply should be procured. One thing, however, is very certain, from the events of the past ten days, and that is, that ample reservoir capacity is absolutely essential for a town situated on a stream, the waters of which may rise at any time to such a height as to flood pumping machinery and extinguish furnace fires.

A correspondent of the *London Globe*, writing about the indifference of the Oriental to filth, says that they regard the pollution of wells with unconcern which is amazing. Most natives, even of the highest caste, have no objection to use, both for domestic and drinking purposes, water which may be described as simply filthy. People wash their clothes and themselves in tanks from which the women take home water for cooking and drinking. The only desideratum is that the water shall be "soft." In some places it has been found useful to set apart by municipal authority certain tanks for washing, and others for the supply of drinking water, but the regulation can only be carried out by appointing watchmen to enforce it. Satisfactory progress has been made in improving the water supply of the great cities, and it would seem that as regards some of these there is not now very much to complain of. An example of the danger incurred by English soldiers from drinking impure water is afforded by an instance reported from Kamptee. A detachment of the 2d battalion of the 13th regiment stationed there suffered from an outbreak of enteric fever. It was speedily noticed that nearly all the patients were teetotallers, and it turned out that the teetotal soldiers had a recreation room of their own, where they drank tea, coffee, ærated waters, and what was supposed to be pure water. On examination, however, it was found that the latter fluid was drawn from a well close at hand, which had been polluted by percolation from neighboring drains. The other men had not drunk from this well, and nearly all escaped the epidemic.

IRON DRAIN PIPES WITH LEAD JOINTS.

Mr. B. H. Thwaite writes: "If iron is brought into contact with lead, galvanic action is at once established, and as the lead is electro-negative to the iron, it is preserved at the expense of the latter; the electrolytic action produces, near the point of contact of the metals, tubercular corrosive action or pitting. The writer has several examples of iron which exhibit the abnormal local oxidation mentioned, and nothing but the electrolytic action, in these instances, could have caused such an abnormal degree of pitting oxidation. A close observation of some old iron raillngs, fastened in lead, will clearly exhibit this phenomenon of local oxidation. The writer has seen iron railings which have actually corroded to a thread at the point of contact, while the upper part of the railing exhibited very little corrosive action. These railings were only subjected to the corrosive influences of the atmosphere of a town; what would, therefore, be the corrosive effect of the contact of lead and iron when subjected to the exciting solutions of ammonia and other acids contained in sewage? The writer has seen ordinary water pipes after a few years exposure, which were a comple'e mass of hydrated sesquioxide, the accumulation of rust having entirely choked them. The writer would be glad to know from Mr. Burton the result of any examination of lead-jointed iron drain pipes, which have been in use for several years. Judging from experience, the writer fancies, that, if the iron pipes before being fixed have not been rendered rustless, they would be found to be almost entirely corroded away, at least, near the lead joints.—*Journal of the Society of Arts.*

ONE OF THE NOT ENFORCED ORDINANCES.

Title 5 relates to the prevention of fires, and contains ordinances from 89 to 110 inclusive. It contains besides the fire limits ordinance, other ordinances requiring semi-annual inspection of all buildings in the city, stove pipes, stoves, chimneys, hearths, etc. Some of the ordinances are out of date, but many of them are good and should be enforced, especially the one in relation to inspection. This should be made the duty of the chief engineer and his assistants, and the enforcement of the ordinances in Title 5 should be made the duty of the regularly employed firemen.—*Utica, N. Y., Herald.*

During December 1882, the average daily consumption of Water in Edinburgh, Scotland, was 13,964,387 gallons, or 43 gallons per head of population supplied. During a very cold spell, at least 5,704,000 gallons per day were wasted by leaving the water running to prevent freezing, and it is stated that the parties who deliberately wasted the most water were the most persistent complainers of the inconvenience that resulted from the lack of pressure in the mains, which was caused by the waste. In this respect, the citizens of Edinburgh and New York are very much alike.

Our readers will feel better satisfied in the stomach to learn that the report that the sewage of the Lunatic Asylum is emptied into the Delaware is untrue.—*Trenton State Gazette.*

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Norfolk st, e s, 100 n Rivington st, br tenem't; cost $13,000; o, Phillippina Haffner; a, A. H. Blankenstein; b, not selected....Mulberry st, No. 276, br tenem't; cost $10,000; o, Trustees of St. Patrick's Cathedral; a, James E. Ware....Columbia st, No, 6, br tenem't; cost $14,000; o, Angellar E. Lyons; a, Wm. Graul; b, Thomas Lyons ... 44th st, n s, 275 w 9th av, two br tenem'ts; cost $20,000; o and b, Moore & Wilson; a, Thom & Wilson....58th st, s s, 200 w 6th av, three b st dwels; cost $12,000 each; o, F. Rosenberg; a, G. W, Da Cunha....3d av, No. 805, br store and tenem't; cost $12,000; o Christian Just; a, J. Kastner....56th st, No. 319 E., br tenem't; cost $17,000; o, a and b, James Brady....Lexington av, n e cor 45th st four br dwels; total cost $85,000; o, a and b, Chas. Graham & Sons ....60th st, n s, 48 w Madison av, three br dwels; cost, each, $30,000 and $35,000; o and b, Chas. Buek....129th st, Nos. 116, 118 and 120, s s, 150 w 6th av, two br tenem'ts; cost, each, $20,000 and $48,000; o and a, W. J. Merritt... 11th av, s e cor 129th st, br piano factory; cost $20,000; owners of leasehold, Behr Bros; a, J. Kastner....Washngton av, w s 60 s 173d st, fr dwel; cost $6,500; o, Sereno D. Bonfils; a, Thos. E. Thomson....3d av, w s, south of 166th st, one br store and tenem't; cost $9,000; o, Chas. A. Edel; a, W. W. Gardiner.... 138th st, s s, 75 e Southern Boulevard, br tenem't; cost $13.000; o, Patrick Wheelan; a, F. E. Verder.

BROOKLYN.

Beaver st, w s, 20 n Park st, four fr dwels; total cost $8,000; o and b, George Loeffler; a, Th. Englehardt....Hart st, s s, 150 w Lewis av, three fr dwels; cost $2,600, each; o, Eliza Mogk....Tompkins av, s w cor Floyd st, two fr stores and tenem'ts, tin roof; total cost $9,500, o, George Wheeler; a, Th. Engelhardt; b, Sach & Armendinger and J. Rueger....Diamond st, Nos. 94 and 96, e s, 250 n Nassau av, two fr tenem'ts; cost, each. $3,450; o, Ledima A. Parks and Allen A. Raynor; a, F. Weber; b, P. Newman and S. F. Bartlett....Columbia heights, w s, 37.6 s Clark st, two br dwels; cost $30,000 for both; o, E. R. Squib; a, Henry Dudley; b, P. Castner ...Lafayette av, n s, 100 w Lewis av, eleven fr dwels; cost, each, $3,500; o, P. F. O'Brien.... Bedford av, s e cor Lexington av, one b st store and flats; cost $10,000; o and b, Thos. H. Brush; a, Fred E. Lockwood.

ALTERATIONS, NEW YORK CITY.

54th st, No. 80 E., s w cor 4th av, br extension, store front in first story; o, R. and O. Goelet, a, Jos. M. Dunn....4th av, No. 919, br extension, store front in first story; o, R. and O. Goelet; a, Jos. M. Dunn....23d st, No. 18 W., br extension, new store front; cost $10,000; o, Sarah L. S. Guernsey; a, D. & J. Jardine....Washington av. s e cor 173d st, raise extension one story, etc.; cost $3,000; o, Anna D. Bonfils; a, Theo. E. Thomson....Broadway, Nos. 1412 and 1414, for hotel purposes; cost $25,000; o, John Brower; a, Henry F. Kilburn; b, not selected....University pl, Nos. 34 and 36, repair damage by fire; cost $7,500; o, Fred Hazelton; a, Saml Warner; b, John D. Miner....Broadway, No. 55, raise building one story; cost $3,000; o, H. H. Houston; a, Babb & Cook; b, not selected....Liberty st, Nos. 92 and 94, add two stories; cost $10,000; o, Chas. Schlesinger; a, Emil Gruwe; b, not selected....30th st, Nos. 511 and 513 W., raise one story and br extension; cost $12,000; o, Chas. A. Kuster; a, Wm. Kuhles....South 5th av, No. 37, br extension; cost $6,000; o, John M. Williams; a, J. C. Markham....Canal st, Nos. 208 and 210, repair damage by fire; cost $4,100; o, John R. Graham; a, J. Demarest; b, Hy. Wallace ...31st st, No. 150 W., br extension, front stable altered, cost $4,000; o, W. H. Tailer; a, L. Breese; b, McKensie & McPherson....Houston st, Sheriff st and 2d st, Union Market, interior alterations, etc., cost $14,000; o, City of New York; a, N. D. Bush....55th st, s s, 375 e 7th av, damaged by fire, alteration to flats; cost $4,00; o and b, J. W. Hogencamp & Son; a, D. & J. Jardine....Broadway, s w cor 33d st; cost $10,000; o, James Trainor; a, D. & J. Jardine.

BOSTON, MASS.—Castle st, 1 br man'f'y and store; o, Henry E. Wright b, Chas. E. Day....154 Pearl st, 1 br man'f'y and store; o, Henry E. Wright; b, Chas. E. Day....16 Centre st, 1 br dwel; o, Louis Prang; b, Chas. Chipman....18 Centre st, 1 br dwel; o, Louis Prang; b, Chas. Chipman....E. 8th st, nr N. st, 1 fr storage of boats; o, Wm. B. Smith; b, Wm. B. Smith....Upton st nr Western av, 1 fr dry house; o, J. O. Whitten; b, J. O. Whitten .. Roxbury st, 1 fr storage of wagons; o, John Roessle; b, Frank Schell....Gardner av, 1 fr storage of wagons; o and b same as last Central av nr Cambridge st, 1 fr dwel; o, Louis B. Davis; b, Spence.

BRIDGEPORT, CT.—Golden Hill st, br res; cost $10,000; o, G. C. Waldo; a, H. Lambert; b, Henry Bars....Main st, double house; cost $8,000; o; W. Watson; a, Geo. E. Potter.

CHICAGO, ILL.—245 Lincoln av, flats; cost $7,000; o, H. Schwuchow; a, H. Sirks; b, Chas. A. Thierm....196 Winchester av, br flats; cost $6,000; o, Jno. West; a, J. W. Ackermann; b, R. E. McKay 689 20th st, br st and dwel; cost $6,000; o, Chas. Last; a, A. Bosalor; b, Wm. Schwerin....130-132 29th st, br livery stable; cost $12,500; o, M. Buckley; a, Crilly; b, Malcolm McMartin....cor Robey and 22d st, br dwel; cost $5,000; o, Henry Valk; a, P. W. Ruchl; b, Bezley & Dykem....3905-3907 Lake av, 3 br dwel; cost $15,000; o, R. W. Dunham; a, Fowler & Carr; b, Fowler & Carr....28 Egan av, br dwel; cost $5,000; o, Mrs. F. A. Hibbard; a, Fowler & Carr; b, Fowler & Carr .. 151 Bunker st, br flats; cost $5,200; o, Jas. Novak; a, J. M. Kralover; b, John Kralover 176 w 12th st, br store and flats; cost $6,700; o, Martin Praznet; a, J. Beshler; b, Jno. Kralover ...916-918 N Ashland av, br dwel; cost $7,000; o, Kleinke & Heinrich; b, owner.

CINCINNATI, OHIO.—Fifth st, near Lock, br dwel; cost $7,500; o, R. T. Pearce; b, Wm. Mitchell....Clay st, nr Canal, br dwel; cost $10,000; o, F. Rannebaum; b, Bruggeman & Co....Parker st, n1 Clifton, br dwel; cost $9,000; o, C. Webber; b, W. Miller...Buckeye st, nr Oak, br dwel; cost $6,000; o, Jno. Tounth; b, William Miller....Ohio ave nr Parker st, br dwel; cost $5,000; o, A. Knorr; b, Wm. Miller.

DENVER.—Arapahoe, cor 14th st, br exten to Denver University; cost $12,000; o, Denver University; a, L. Cutshaw....East Denver st, br school house; cost $30,000; a, R. Roschlaub....Holliday and 31st st, br factory; cost $10,000; ; o, Milburn; a, W. Quayle South 12th st, br terrace; cost $8,000; L. Carrico; a, W. Littlefield....South 14th st, br dwel; cost $7,000; o, Mrs. W. Byers; a, Edbrook & Burnham. Not as much new work as last year. Labor and materials very cheap.

PHILADELPHIA, PA.—Jefferson, bet Mansion and Hamilton, three dwell houses; o, Alex McCormick....2418 n Front, ware house; o, Thos. Neely....Stewart and 22d, br foundry; b, Jas. B. Doyle ....Ringold and Parish, six dwells; o, Jas. Beatty & Son....34th n of Race, two dwells; b, E. & A. L. Pennock....Brown, n e cor 4th, dwell, add to ice house; b, John Kramer....Westmorlan, w of 11th, four dwells; b, Jas. H. Dorf....Federal, n e cor 26th, dwell; o, Jas. Hamilton....634 Pemberton, br shot factory; b, S. P. Rush.

READING, PA.—Penn st, br house; cost $5,000; o, B. Martzbacher.... 7th st. br house; cost $4,000; o, Dr. J. C. Detweiler....7th st; br house; cost $2,500; o, E. B. Wingert....6th st, br house; cost $3,500; o, L. Spohn ...13th st. ten br houses; cost $18.000; o, Neversink B Assoc.; b, C. Frantz... Muhlenberg st, hat factory; cost $20,000; o, E. Savage.

WASHINGTON, D. C.—M st, w of 14th, br with cellar; cost $8,000; o, A. R. Kirkwood; a, Frederick; b, F. S. Obold....s e cor 2d and 15th, br and basement; cost $5.000; o, M. Foster; a and b, O. V. Nerta ..G st bet 9th and 10th; br and cellar; cost $25,000; o, National Rifles: a, Brady; b, Geo. H. Turton....L st nr 17th, two br and cellar; cost $6.000; o, L. P. Graham; a and b, Henderson.

MISCELLANEOUS.

WATERVILLE, ME.—Bids are now being received by the Building Committee of Colby University for the construction of a $40,000 br and freestone bldg to be used by the Waterville, Me., Classical Institute. Ex-Gov. Coburn, of Skowhegan, will pay for the bldg and donate it to the Institute.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Feb. 17.....	24.60	18.68	22.35	26.88	29.54	19.25

E. G. LOVE, Ph.D., *Gas Examiner.*

Meter-ites.

London *Post* says a petroleum well has been struck at the Elm Colliery, Buckley, Flintshire.

The Standard Gas Light and Coke Company of Xenia, O., was incorporated the 1st inst. Capital $50,000.

Another gasoline explosion is reported from Amsterdam, N. Y., which wrecked a building of S. Blaisdell, Jr. & Co.'s. knitting mills.

President Hickenlooper of the Cincinnati Gas Company has petitioned the Board of Public Works for such an alteration of grades of street as will elevate the proposed new gas works two feet higher than was first set, in consequence of experience gained by the recent floods.

The New Orleans *Picayune* demands the repeal of the ordinance granting a franchise to the Light and Heat producing company, for the reason, among others, that it is so framed it does not bind the company to ever do anything, and gives the parties the right to sell out again, if they can get hold of another patent.

The New England Association of Gas Engineers met at Young's Hotel, Boston, last week, and elected the following officers: President, A. B. Slater, of Providence, R. I.; Vice-Presidents, M. S. Greenough, of Boston, and J. P. Harrison, of Hartford, Conn.; Directors, A. M. Morton, of Nashua, N. H.; S. G. Stevens, of Pawtucket, R. I.; Wm. Yorke of Portland, Me.; J. S. Hallett, of Springfield, Mass.; C. H. Nettleton, of Birmingham, Ct.; Secretary and Treasurer, George B. Neal, of Boston.

As a result of the recent argument before the Attorney-General in the matter of Stewart & Boardman representing George William Curtis and other residents and property-owners of Staten Island against the Standard Oil Company, the defendants, through their counsel, Scudder & Carter, have stipulated to waive any immunity on account of their being a New Jersey corporation, to put themselves under the supervision of the New York State Board of Health, and to adopt all possible devices for abating the nuisances complained of. The stipulation has been accepted and the complaint has been withdrawn as far as the Standard Oil Company is concerned.—*Tribune.*

ELECTRIC LIGHT NOTES.

One hundred and fifty Edison lamps are used in the new building of the Boston *Advertiser.*

The Electric Lighting Company of Omaha started with lighting 40 arc lights in business houses the 27th ult.

The American Electric Light Company, now of Hartford, will transfer their headquarters to Lynn, Mass., where they will erect works at once.

The Brush Electric Light Company will introduce their storage batteries for house lighting into New Orleans. It was "formally opened to the public" in Chicago the 21st ult.

The Austrian Minister has informed the Secretary of State that the International Electrical Exhibition to be held at Vienna, in August, September and October next, though a private undertaking, has been sanctioned by the Austrian Government. It is also stated that though applications for space should, according to the regulations, be made before March 1, yet American exhibitors can be accomodated after that date.

A soap mine has been discovered in California. The substance is a deposit of white earth, free from grit, and impregnated with a small percentage of potash. It is easily sliced into bars, and, for cleaning purposes, is a fair substitute for manufactured soap.

Food and Drugs.

CONFERENCE OF MANUFACTURERS WITH NEW YORK STATE BOARD OF HEALTH.

The New York State Board of Health held a special and important meeting at the School of Mines, Columbia College, in this city, on Saturday, the 24th inst. There were present Dr. Moore, the President, Hon. Erastus Brooks, Dr. Delevan, Dr. Wm. M. Smith, Prof. Gardner, Prof. Chas. F. Chandler and Dr. Elisha Harris, the Secretary.

The special purpose of this meeting was to enable manufacturers and dealers in food and drugs to be present and give their views with regard to contemplated rulings touching articles to be sold as mixtures, and the conditions to be imposed.

A representative of the Retail Grocers' Union desired to know if the Board would avail themselves of the services of retail dealers in prosecuting wholesale merchants who sold them adulterated goods. He was given to understand that in cases where the Board were satisfied the witness was acting in good faith they would be glad to avail themselves of his assistance. A few speakers dwelt entirely on what they considered a hardship, in not being permitted to manufacture fraudulent articles, because persons were permitted to do it in other States, and they thought that capital thus employed would be driven from the State. The sentiment of the majority of those present, as expressed, was favorable to the adulteration law and its enforcement.

The following questions were offered and voted upon by the manufacturers and dealers in food products who were present:

1st. Is it proper to permit the use of harmless coloring matter in mustard mixtures?

The vote was unanimously in the affirmative.

2d. Should all the component parts of a mixture be printed upon the label?

The vote was unanimously in the affirmative.

3d. Should the percentage of each and every constituent of the mixture be printed on the label?

The vote was unanimously in the negative.

4th. Should the percentage of the leading or characteristic constituents of a mixture be printed upon the label?

The vote was in the affirmative.

5th. The question of requiring that the labels for each particular mixture be submitted to the State Board of Health for approval was discussed, and the manufacturers present approved of the proposition.

After the conference the Board met and passed the following resolutions:

On motion it was

Resolved, That the resolution with regard to mixtures of mustard and coffee, adopted at the meeting, held on January 6, 1883, be amended so as to read as follows:

Resolved, That under and pursuant to Sec. 4, of Chap. 407 of the laws of 1881, the following mixiures, when distinctly labelled in the manner provided in sub-division 7 of Sec. 3 of said Act, are within the conditions hereinafter prescribed, declared to be exempt and permitted to be sold under the provisions of the said Act.

1st. Coffee mixtures containing no other substances except chiccory, peas or cereals, and in which mixtures the pure coffee shall not be less than 50 per cent. of the whole mixture or compound, provided the exact percentage of coffee be printed upon the label of each package.

2d. Mustard mixtures with wheat or rice flower to which no other substance, or article, or any coloring matter except turmeric is added, and in which the pure farina of mustard shall not be less than 40 per cent. of the whole mixture or compound, exclusive of the mustard hulls.

The labels on the above mixtures shall contain the names of each and every ingredient of the mixture.

The labels shall also exhibit the percentage of the characteristic constituents; for example, the percentage of coffee in the coffee mixture, and the percentage of mustard in the mustard mixture.

The above mentioned information shall be printed on the labels in black ink, in legible antique type of a size easily to be read on one side of the package.

Resolved, That this Board regrets to learn that a bill to permit the sale of skimmed milk has been presented to the Legislature.

That in its opinion this bill, if it should become a law, would seem no additional protection against the sale of impure or unwholesome milk; existing laws having been found entirely adequate for this purpose.

While such a law would seem no additional protection, experience in other States has shown that it would practically paralyze the State and local boards of health in regulating the sale of milk.

Resolved, That the Secretary be directed to send copies of these resolutions to the President of the Senate and to the Speaker of the Assembly.

A NEW TRIAL ORDERED IN A TEST CASE.

Judge Cowing yesterday rendered a decision, in the appeal from the Court of Special Sessions, in the case of Henry Fulle, a grocer of No. 823 Second avenue, who was fined $10 on January 9 on a charge of selling adulterated cream of tartar. The cream of tartar bought of Fulle was found to contain ninety-two parts of ground gypsum and eight parts of tartaric acid. Judge Cowing sets aside the judgment of the Court of Special Sessions, and orders a new trial on the grounds that the cream of tartar was sold as an article of food and not as a drug, as charged in the complaint, and that the defendant had no criminal intent, as when he bought the cream of tartar he inquired for the best article in the market and paid the highest market price.—*Tribune, Feb.* 24.

[We shall consider the points made by Judge Cowing's decision at another time, though we do not believe it affects the law or the other cases to be tried.]

A WEAK CASE.

NEW YORK, *Feb.* 23, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you kindly give me your opinion as to the probable action of the State Board of Health in a case like the following: Suppose I ask a grocer for one pound of coffee, and instead of coffee he gives me a mixture of coffee and chicory, which is labelled as a mixture, but the label of which I do not notice until after leaving the store. Nothing is said by either party during the purchase. Is the grocer liable to prosecution? In other words, is the purchaser obliged to read the printing on the label? Suppose he cannot read? Z.

[We should suppose that the Board would select cases for prosecution more likely to result in a verdict against the defendant.]

A bill introduced in the California Senate the 6th ult., makes it a "misdemeanor for any person to sell or expose for sale any milk that does not contain all the essential properties of average country milk in their just proportions; every person who shall have in his possession for sale, or who shall sell milk from which the cream or any part thereof has been removed, shall likewise be guilty of a misdemeaner, as likewise persons selling swill milk, or milk produced from cows fed on distillery-slops."

In the House of Representatives, of Massachusetts, the committee on public health have under consideration the expediency for legislation to regulate practice of pharmacy in the State; the committee on water supply and drainage, to prevent pollution of Blackstone river by sewage of city of Worcester. Also to prevent pollution of streams of the Commonwealth by sewage from municipal systems of sewerage and other sources, and waste of manufactures.

On the 9th ult., three cases of food adulteration were settled in the Court of Special Sessions. S. Steiermann, C. Sinnigen and P. Greifenstein were charged with selling mustard adulterated with flour. In each case the defendant pleaded guilty and was fined $10.

Prof. C. F. Chandler of this city read a paper to the New York farmers at Delmonico's, last week, on butter.

The Connecticut Pharmaceutical Association met in Waterbury Feb. 6th and 7th.

The test of the capacity of a fool's stomach, which has been creating such an excitement in certain circles in New York, has stimulated some Philadelphians to a task even more difficult. A wager has been made between two sporting men that a man could be produced by one of them who would drink a quart of Schuylkill water within ten minutes, every day for six days.

Gov. Ireland, of Texas, has advised in a message to the Legislature that vaccination be made compulsory in that State. "I am, as a rule," he says, "very thoroughly opposed to paternal governments, but on this subject I am as firmly fixed.—*N. O. Picayune.*

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING FEBRUARY 17, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	20	29.6	2	10.0											4							
Boston.....Mass.	407,581	156	19.7	38	24.3	7		29	2	2	11		3	1	5	21		9	1		3		
Cambridge.....Mass	57,432	21	18 7	4	19.0			3	1	1	3					2	1	1					
Worcester.....Mass.	64,995	28	22.4	5	17.8			4		2					1	3							
New Haven.....Conn.	66,979	25	19.2	7	28.0			6								3				1	1		3
Providence.....R. I.	114,723	48	21.3	14	29.1		1	6	1	1	2	2	4			4		1					
Total	746,229	298	20.3	70	23.4	7	1	48	4	6	16	2	7	1	6	37	1	11	1	1	4		3
EASTERN CITIES.																							
Albany.....New York	98,430	36	18.7	11	30.5	1		9	2		1		1		1	5			1	1			
New York.....New York	1,299,249	623	24 4	237	38.0	14	8	119	16	10	23	2	2	12	15	99				7	11		1
Brooklyn.....New York	633,763	269	21.8	103	38.2			34	9	2	9		3	5	15	39	2				2		2
*Hudson Co.....New Jersey																							
*Newark.....New Jersey																							
Paterson.....New Jersey	58,324	18	15.6	6	33.3			2								1							
Philadelphia.....Pa.	907,043	367	21.0	115	31.3	7	1	51	10		18		11		7	35	6	7				2	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	27	29.6	8	29.6			2	1							1	1					10	
Total	3,043,698	1.340	22.9	480	35.8	22	9	217	38	12	51	2	17	17	38	180	9	7	1	8	13	12	4
LAKE CITIES.																							
Buffalo.....New York	168,702	54	16.6	16	29.6	5	2	9			5		1		6	4	1	2					
Rochester.....New York	92,116	34	18.7	10	29.4			5			1					2		1					
Syracuse.....New York	54,696	18	16.6	5	27.7			2		1		1				3							
Cleveland.....Ohio	192,084	76	20.3			2		5	2		7	2	3	1	1	8	4		1		3		
Detroit.....Michigan	131,118	63	25.0	29	46.0			6	2		8	1	1		4	3	2				1		
Chicago.....Illinois	597,834	220	18.7	87	39.5	7	2	24	4	1	10	6	2	1	6	31	1	10	1	1	7	3	3
Milwaukee.....Wisconsin	135,233	54	20.3	25	46.2	1		8	4	1	3	1			2	5	1	1			1		1
Total	1,371,783	519	19.2	172	33 1	15	4	59	12	3	34	11	7	2	19	56	9	14	2	1	12	3	4
RIVER CITIES.																							
Allegheny.....Pa.	89,038	31	17.7	13	41.9		2	5	1	1			2			4		1					2
Pittsburgh.....Pa.	191,523	93	25.0	29	31.1	5	1	12		3	4		12			11		1				1	2
Cincinnati.....Ohio	267,767	145	28.1	53	36.5	8	1	20	3	2	4	2			10	18	3	7		3	2		3
Dayton.....Ohio	41,648	7	8.3	3	42.8			2			1			1									
*Louisville.....Ky.																							
Indianapolis.....Indiana	86,529	28	16.6	8	28.5			3	2				1	1		4	1	1			1		2
*Terre Haute.....Indiana																							
Minneapolis.....Minn.	98,026	19	9.8	4	21.0						2	1	1					1				2	
*St. Paul.....Minn.																							
*St. Louis.....Mo.																							
Total	773,531	323	21.3	110	34.0	13	4	42	6	6	11	3	16	2	10	37	4	11		3	3	3	9
PACIFIC CITIES.																							
San Francisco.....Cal.....(Feb. 9th)	270,325	103	19.7	22	21.5	4		13		6		1	1			16	2	1			5		
SOUTHERN CITIES.																							
District of Columbia.....Wh.	136,471	43	16.1	9	20 9			7	1		2		2		5	5	1	2					
" " .....Col.	71,103	46	33.2	21	45.6	4		10					2			8		3					
Richmond, Va.....Wh.	38,526	14	18.7	5	35.7			1								1		1					
" .....Col.	29,394	14	24.4	2	14.2		1	4								1							
Charleston S. C.....Wh.	22,699	8	18.2	1	12.5											2							
" .....Col.	27,595	21	39.5	4	19.0			6								2							
Atlanta Ga.....Wh.	25,583	10	20.3	4	40.0	1		2								1							
" .....Col.	19,421	10	27.0	3	30.0			2								2	1						
Savannah Ga.....Wh.	15,041	10	34.3													1							
" .....Col.	16,506	17	53.1					3		2			1			3					1		
Nashville Tenn.....Wh.	31,993	9	19.7	1	11 1		1	2								2						1	
" .....Col.	19,406	11	29.1	5	45.4			4															
Memphis Tenn.....Wh.	18,677	15	41.6	2	13.3			5		1				2									
" .....Col.	14,896	12	41.6	7				2						1		3		1					1
Mobile Ala.....Wh.	16,927	7	21.3					2								1							
" .....Col.	14,868	3	10.4					2															
New Orleans La.....Wh.	163,757	96	30.2	23	23.9	3	3	15			1		2	6		8		4				10	
" " .....Col.	59,866	51	44.2	10	19 6		3	16						1		6		1	2			11	1
Total White	469,674	212	23.4	45	21.2	4	4	34	1	1	3		4	8	5	21	1	7				11	
Total Colored	272,355	185	34.9	52	28.1	4	4	49		2			3	2		25	1	5	2		1	11	2
Total in 35 U. S. Cities	6,947,595	2,980	21.8	951	31.9	69	26	472	61	36	115	19	55	32	78	272	27	56	6	13	35	40	22
Jan 27,—Total in 16 Irish Cities	843,976	516	31.8			5		71		11			5		3	153				4			15
Feb. 3, " 28 English Cities	8,620,975	3,910	23.7			112				40	31		77		103					46		8	106
Feb. 3, " 8 Scotch Cities	1,233,088	624	26 3			23				21	17		10		10	153				7			51
Feb. 3, " 16 Irish Cities	843,976	526	32 0			6				16	1		7		11	149				5			26
Jan. 13, " 167 German Cities	8,459,496	4,199	25.8	1,851		103		640	24	149	191		42		81					51	15	6	45

By a typographical error, the table given in THE SANITARY ENGINEER of last week, page 277, was headed as being for the week ending February 3 instead of February 10, as it should have been.

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending February 17, of an urban population of 6,947,595, there died 2,980, which is equivalent to an annual death rate of 21.8 per 1,000, or the same rate as that for the month of January.

For the North Atlantic cities the death rate was 20.3; for the Eastern cities 22.9; for the lake cities 19.2; for the river cities 21.8; and in the Southern cities for whites 23.4, and for the colored 34.9 per 1,000.

Cincinnati reports a mortality rate of 28.1, as against 23.1 the preceding week, the increase being due to accidents, scarlet fever and diseases of the lungs. Deaths from small-pox are reported, in Philadelphia two, Wilmington ten, Chicago three, Pittsburgh one, Minneapolis two, Nashville one, and New Orleans 21.

The mortality rate in our larger cities continues less than in those of Great Britain or Germany.

BOSTON, MASS.—C. E. Davis. Jr., reports 30 cases of diphtheria, 17 of scarlet fever and three of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 20 cases of diphtheria and 12 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 12 new cases of scarlet fever and seven of diphtheria.

WHEELING, W. VA.—Dr. Edward reports two new cases of small-pox.

PITTSBURGH, PA.—Dr. W. Snively reports four new cases of small-pox.

NEW YORK CITY.—The tabulated death from small-pox is reported by Dr. John T. Nagle as having been derived from the S. S. "Elbe" from Bremen.

NEW YORK CITY LUNATIC ASYLUM.—Dr. T. M. Franklin reports ten admissions, three discharges, no deaths and 1,332 insane patients remaining under treatment.

NEW HAVEN, CONN.—Dr. J. J. S. Doherty reports the population of the city as 73,000, according to the school census of the past year.

SANDWICH, ILL.—Dr. N. E. Ballou, in reporting a death from scarlet fever, during the week ending Feb. 17, states that the disease is very prevalent.

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PROVIDENCE, R. I.—Dr. E. M. Snow, in commenting upon the fact that there were only 31 deaths in the city during the week ending Feb. 10 as compared with 56 during the previous week says: The extremely small number of deaths last week, no more than the large number the week before, does not indicate any sudden change in the public health. There is more sickness in the city than the average for the season; but the gradual disappearance of typhoid fever, and the small number of deaths from diphtheria and other zymotic diseases are favorable indications of an improvement.

For a more striking illustration of weekly variation see below, Camden, N. J., weeks ending Feb. 3 and 10.

PATERSON, N. J.—Dr. W. K. Newton, in transmitting report for the week ending Feb. 17, states that the population in 1880 was 50,887, but that it has increased since then to 57,000. Our calculation based on the increase during the decimal period 1870–80 gives the city a population of 58,324 on March 1, 1883, the middle of the sixth half year from the date of the last census.

BALTIMORE, MD.—The report for the week ending Feb. 17 shows the occurrence of 204 deaths; males 118, females 86; under five years 84, over 60 years 23. The annual rate, based upon the population as estimated by the local authorities, is reported as, whole population 25.93, white 23.98, colored 37.26. Small-pox caused 51 deaths, consumption 28, bronchitis six, congestion of lungs three, pneumonia ten, typhoid fever two, malarial fever one, scarlet fever seven, puerperal fever three, diphtheria 15, croup three, and accident one. No deaths are recorded from whooping cough, measles or diarrhœa.

LAZERNE, WARREN CO., N. Y.—At a meeting of the Board of Health held Jan. 30, rules and regulations were adopted looking to the improvement of the general sanitary condition, the prevention and regulation of contagious diseases, the registration of vital statistics, and the issuance of burial permits.

FORT WORTH, LARRANT CO., TEXAS.—Belle M. Burchill, P. M., reports under date Feb. 13, that small-pox has occurred with some violence in the city. During the week ending Feb. 10 there were seven deaths from this disease and 12 new cases reported.

MICHIGAN.—Dr. H. B. Baker's report for the week ending Feb. 10 shows the following diseases in their order of prevalence: neuralgia, bronchitis, rheumatism, consumption, intermittent fever, tonsilitis, influenza and pneumonia. Diphtheria and scarlet fever were each reported at 19 places and measles at 16 places. Small-pox at St. Joseph, Berrien Co., was reported as having ceased Feb. 10.

DAYTON, OHIO.—Dr. E. B. Davis reports 10 deaths from all causes during the week ending Feb. 10; of these three occurred in persons under five years of age. One death was caused by consumption, one by malarial and two by puerperal fevers. Two cases of small-pox were reported Feb. 10 as being present in the city.

SAVANNAH, GA.—Dr. J. F. McFarland reports for the week ending Feb. 10 a total of 20 deaths: whites eight, colored 12; under five years not stated. Two of the whites are reported as having died of cerebro-spinal meningitis. One of the colored died of consumption and four of pneumonia.

CAMDEN, N. J.—Dr. H. F. Palm sends reports for the weeks ending Jan. 27 and Feb. 3 and 10.

Jan. 27: total mortality 11, under five years four; accident, consumption, scarlet fever, pneumonia and acute bronchitis caused one death each.

Feb. 3: total mortality six, under five years one: typhoid fever caused one death.

Feb. 10: total mortality 26, under five years five; consumption caused five deaths, diphtheria one, typhoid fever two, pneumonia three and bronchitis one.

NEWARK, N. J.—The Annual Report for 1882 shows a total mortality of 3,921; men 898, boys 1,176, women 776, girls 1,071; under five years, 1,840, over 60 years, 590. Bronchitis caused 197 deaths, diarrhœal diseases 194, malarial fevers 55, scarlet fever 199, typhoid fever 57, typhus fever four, puerperal fever eight, diphtheria 126, croup 94, pneumonia 299, small-pox 14, whooping cough 31, consumption 477, and violence 86.

MACON, GA.—The First Annual Report of the Board of Health of this city gives the mortality statistics from March 1, 1882, the date at which the first reports were made, to Dec. 31. Total mortality 240, including eight deaths by accidental causes. Deaths by disease 232; white males 46, females 57; colored males 54, females 75. Annual rate for the whole population, 16.36; for the whites 13.77, for the colored 19.37. Bronchitis caused two deaths, diarrhœal diseases nine, malarial fever 18, typhoid fever five, scarlet fever one, puerperal fever one, croup four, diphtheria one, consumption 35, and pneumonia 12. The cause of death in 38 cases is reported as unknown.

CONCORD, N. H.—The report for the year 1882 gives the total deaths as 216; population 14,000, rate 15.44. Croup and diphtheria caused seven deaths, erysipelas one, typhoid fever eight, cerebro-spinal meningitis one, whooping cough three, diarrhœal diseases eight, consumption 38, bronchitis three, congestion of lungs three, pneumonia 14, and violence four. Forty-two of the deaths occurred in children under five years of age, and 56 in persons over 70 years. The number of births in 1882 was 272, not including 18 still-births; males 130, females 142.

RICHMOND, VA.—Dr. J. G. Cabell transmits a summary of the deaths which occurred during the year 1882. For comparison the figures of 1881 are given in brackets: Estimated population 68,000 (66,000). Total deaths, 1,853 (2,049); whites 792 (865), colored 1,061 (1,184.) Annual rate, whites 19.80 (22.29); colored 37.89 (43.19). Still-births 147 (161). Croup 12 (12), diarrhœal diseases 179 (195), cerebro-spinal meninigitis 17 (eight), diphtheria 17 (16), erysipelas five (six), congestive fever eight (four), measles three (14), puerperal fever eight (ten), remittant fever five (four), scarlet fever eight (unknown), small-pox 96 (150), typhoid fever 52 (72), whooping cough 12 (35), consumption 247 (281), bronchitis 18 (23), pneumonia 103 (83), and violence 72 (69).

SANTIAGO DE CUBA.—Consul Jno. C. Landreau reports for the month of January a total of 83 deaths in a population of 40,000. Six cases of yellow fever are reported and six deaths from that disease, but the harbor and its vicinity continue free from the infection.

DEMERARA, BRITISH GUIANA.—Consul Philip Figgelmesy transmits the reports for the month of December, from Georgetown and New Amsterdam.

In the former city there were 168 deaths and 132 births, in a population of 47,175. Of the 168 deaths 86 occurred in hospital and other public institutions; 31 were infants under one year of age, and 51 of persons of one year and upwards, occurring in the city. Croup caused one death, malarial fevers five, diarrhœa and dysentery 19, leprosy five, consumption 37, tetanus six, pleurisy one, pneumonia two, and violence two.

In the several divisions of New Amsterdam, containing a population of 8,124, there occurred 39 births and 54 deaths. Of the deaths, 38 took place in hospitals and other institution; six were under one year and 10 occurred among persons of one year and upwards in the town. Diarrhœa caused two deaths, remittent fever one, consumption three, tetanus one, bronchitis and pneumonia four, and violence four.

GUAYAQUIL, ECUADOR.—Vice-Consul A. Destruge sends the mortality report for 1882. Total number of deaths 2,143, of which 938 were caused by "fevers," 296 by yellow fever, 207 by consumption, 130 by pneumonia, 73 by dysentery, nine by small-pox, 45 by diarrhœa, and 10 by tetanus. In the year 1880 there were 3,096 deaths, in 1881 2,244 deaths, and in 1882 2,143 deaths. Population not stated on the report.

ENGLAND.—Deputy-Consul General L. H. Mitchell sends the returns of the registrar-general for the weeks ending Jan. 27 and Feb. 3.

During the former week the average mortality in the 28 great towns of England and Wales was 22.4 per 1,000, Brighton giving the lowest rate, 12.7, and Liverpool the highest, 31.1. During the latter the average rate was 23.7, Portsmouth giving the lowest, 17.9, and Sunderland the highest, 35.3.

LONDON.—During the week ending Jan. 27, 2,670 births and 1,548 deaths were registered; the former were 149 and the latter 50, many as 347 below the average numbers in the corresponding weeks of the past 10 years. The annual mortality rate was 20.4. The 1,548 deaths included eight from small-pox, 33 from measles, 40 from scarlet fever, 24 from diphtheria, 37 from whooping cough, two from typhus, 17 from typhoid fever, 13 from diarrhœa and dysentery. The deaths from these zymotic diseases were 78 below the corrected average number.

During the week ending Feb. 3 there were 2,750 births and 1,643 deaths, the former being 96 and the latter 369 below the average. Annual rate 21.7. Small-pox caused five deaths, measles 28, scarlet fever 45, diphtheria 20, whooping cough 35, typhus three, typhoid 15, and diarrhœa and dysentery 19. The deaths from zymotic diseases were, as during the previous week, 78 below the corrected average.

SCOTLAND.—Consul J. A. Leonard transmits returns of registrar-general for week ending February 3. The mean death-rate in the eight principal towns was 26.3 or 5.2 above that for the corresponding week of last year. The lowest mortality was recorded in Edinburgh, viz., 19.2, and the highest in Greenock, viz., 32.0 per 1,000. The deaths from acute diseases of the chest decreased slightly. For summary see table above.

IRELAND.—Consul A. B. Wood transmits a copy of the registrar-general's return of deaths in the 16 principal urban districts for the week ending January 27. An abstract of the data contained in it is given in our table above.

BELFAST.—Total mortality 116. Annual rate 28.2. Measles, typhus fever and violence caused one death each, scarlet fever three, whooping cough five, consumption 18 and diseases of the respiratory system 40.

PARIS, FRANCE.—The bulletin for the week ending February 1 shows a total of 1,149 deaths; males 662, females 487; under five years 346, over 60 years 256. Annual rate 26.66. Typhoid fever caused 45 deaths, small-pox 15, measles 17, scarlet fever three, whooping cough eight, diphtheria and croup 38, erysipelas three, puerperal infection none, consumption 239, acute bronchitis 33, pneumonia 95 and violence 24. On January 28 there remained under treatment in the hospitals 67 cases of small-pox, 538 of typhoid fever and 35 of diphtheria. The births during the week numbered 1,253.

The epidemic of typhoid fever seems to be undoubtedly at an end. It began about the 4th of August, 1882, and since then has numbered at least 2,437 victims. "The facts connected with this epidemic show that the violence of epidemic diseases can be mitigated only by hygienic means, *i.e.*, for diseases treated at home, the employment of disinfectants, and for those not thus cared for, their transportation to extra-mural hospitals."

RHEIMS, FRANCE.—Consul Jno. L. Frisbie transmits reports for the week ending January 27 giving a total of 49 deaths, caused chiefly by lung diseases rendered prevalent and fatal by the continuance of damp weather variable as to temperature.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits report for week ending January 20 showing the occurrence of 91 deaths; males 39, females 52; under five years 38, over 60 years 20. No deaths are recorded from small-pox, measles, whooping cough or violence. Scarlet fever caused six deaths, puerperal and typhoid fevers one each, diphtheria and croup nine, diarrhœa two, consumption 11, pneumonia 15 and bronchitis 14.

During the week ending January 27 there were reported 60 cases of measles, none of small-pox, 26 of scarlet fever, 13 of whooping cough, ten of diphtheria, five of typhoid fever, 36 of diarrhœa, 20 of tonsilitis, 17 of pneumonia and 133 of bronchitis.

FIRST ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF THE STATE OF NEW HAMPSHIRE, for the Fiscal Year ending April 30, 1882, with the Registration Report 1881. Concord, 1882. 318 pp. 8vo.

The State Board of Health of New Hampshire was organized in September, 1881. One of its first acts was to issue a circular of warning with regard to small-pox, calling attention to the law providing that all children must show satisfactory evidence that they have been properly vaccinated before entering school. The Board considers that its efforts to secure vaccination throughout the State were very successful, and believe "that New Hampshire was never so well protected against small-pox as at the present time. Bovine virus was almost exclusively employed. The paper of Prof. C. A. Lindsley, of Yale College, upon vaccination, published in the last report of the Connecticut State Board of Health, is reprinted in this report, and properly endorsed as containing many valuable facts and suggestions. We are very glad to see this as an evidence that the Board is prepared to make use of good work wherever it finds it. The report contains papers by Dr. G. P. Conn on ventilation, and Mr. W. R. Briggs on school buildings, which have already been noticed in the SANITARY ENGINEER. The paper on adulteration of food, by Dr. E. J. Bartlett, of Hanover, gives a brief sketch of existing legislation on the subject, and properly takes the ground that "the grinning death's head of the skeleton that sits in the pot is too sensational a picture for to-day. Now, a mighty dollar, with a shrewd wink upon the eye of the glorious fowl, would be a much more suitable devise for a treatise upon food adulteration. It is honesty, not existence—for the most part money, not health—that is at stake." The statistics given, which seem to be fairly and accurately compiled, show that of 6,225 samples of food examined in recent years in the United States and Canada, 2,830 or 45.24 per cent. were adulterated. The report closes with the remark that "such restrictions as will secure honest trade are surely for the advantage of all honest men."

Dr. Irving A. Watson, the Secretary of the Board, contributes a useful compilation of "Common Law Citations relating to Nuisances," and Dr. A. H. Crosby furnishes a brief but suggestive paper on "Water Pollution, Public and Private."

The registration report is presented with the remark that the present law is defective and will not secure correct returns. The figures given indicate a birth rate of 13.30, and a death rate of 13.40 per 1000 of living population, but these are evidently much too low.

In an appendix are given the laws of the State relating to public health, and the registration of vital statistics.

We congratulate the Board upon this its first report. It is a common sense, business-like document, avoiding sensational appeals, and we hope it is the first of a long series of instructive and useful health and registration reports.

SCARLET FEVER IN VIRGINIA.

The Wytheville *Dispatch* says that the extent to which the scarlet fever is spreading throughout the Valley of Virginia is appalling. About a month ago it broke out near Staunton, and has since reached that city, and spread to such an extent that many of the schools have been forced to close.

The report of Dr. McCann, the Examining Physician of the Bureau for the Medical and Surgical Relief of the out-door poor in New York City, shows that during the month of January 2,142 applicants were admitted to hospitals; 867 going to Bellevue, 593 to Charity Hospital and 555 to the Homœopathic Hospital. Of these, 35 were cases of fever, 192 general diseases, 270 diseases of the nervous system, 366 diseases of the respiratory organs, 151 due to alcohol, and 445 were surgical cases.

The Fall River Board of Health finds fault with the Watuppa Reservoir Company for allowing poisonous vapors to arise from the pond during low water in summer, and suggests a petition to the Legislature to compel the company to abate the nuisance.

The State Board of Health of Wisconsin at a meeting at Madison, Jan. 31, adopted resolutions requesting Congres to remove the restrictions placed on the National Board of Health and give them sufficient means to carry on the work hitherto committed to them.

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MEMPHIS SYSTEM OF SEWERAGE IN PARIS.

In 1881 an order was given by the Municipal authorities of Paris for the assignment of a district in the interior of Paris for trial on a larger scale of Waring's system of sewerage, including a modification of the house drainage substantially according to the method adopted in Memphis. Plans were made and estimates were prepared. Nothing further was done.

The subject of "The Odors of Paris" having excited much attention for several years, and the very serious epidemics of typhoid fever in different parts of the city in 1882, led to the formation of a Municipal Commission of forty members for the investigation of the whole subject. From this there were constituted sub-commissions, to one of which the subject of sewerage was referred, it being a definite part of its duty to examine into the merits of the systems of Lieunier, Berlier and Waring. Col. Waring appeared before this commission in November accompanied by Mr. Ernest Poutzen, C.E., who is the European consulting engineer of the Drainage Construction Co., owning the Waring patents. Mr. Poutzen was called before the Commission again Jan. 10, '83. As a result of the discussion then held, an order has been given for the immediate constuction of about three or four kilometers of sewers and the complete redrainage of about 100 houses adjoining, the population reaching to from 7,000 to 10,000. The work is to be executed by the Drainage Construction Co. under a contract with the city, the city paying for the sewers, flush tanks, etc., and the re-arrangement of house drainage being at the cost of the proprietors, in consideration of a remission for five years of the heavy sewer tax now imposed. This remission will be ample to cover the cost of the modification.

Owing to the rapid growth of the population there are very large districts of Paris which have no sewers whatever, and these have been the chief seats of the typhoid epidemics. If this experimental piece of work proves satisfactory to the authorities, it is hoped the system will be extended.

THE NEED OF SEWERS AT CINCINNATI.

[From our Special Correspondent.]

A completed sewer system would prove of infinite value to Cincinnati and her low suburbs at this time. The submerged district extends for about three miles along the river front. Within the city proper, for about a mile in extent, the waters have covered Water, Front and Second streets, and lapped upon Pearl street, the fourth from the river. In the western portion the flood reached Fifth street and covered all the streets in Mill creek bottom from the river northward, including Cummingsville. Several square miles of houses, therefore, have been inundated. Had the sewerage system been perfect the thousands of full cellars and vaults would have been drained as the river crept back into its channel. Unfortunately, however, say one-half of the flooded district is without sewerage of any kind, and the dwellings and business houses sit over a small lake of water, which must either be pumped out by individual owners or be allowed the time necessary to evaporate and filter through the soil. The expense or the tedious waiting for the water to pass away is of small moment compared with the outlook from a sanitary point of view. Do what they may, before midsummer the unsewered district will not be dry again. And what of disease and death lurks in those undrained cellars and vaults when the warm sun shall give it wings is a matter for serious consideration, and one which concerns the whole city. The fear of an epidemic to follow the flood is increased by the deplorable condition of our streets, and the want of an efficient sanitary department. Neither the street cleaning nor sanitary department, especially the former, have had sufficient money at their disposal to keep up the thoroughfares or maintain a good sanitary condition otherwise, and thousands are looking fearfully forward to the approaching summer as a most favorable season to reap the fruits of incompetentcy and parsimony. The whole city government seems on the eve of being revolutionized, and the opposing party are struggling for supremacy in the coming adjustment. One bill is pending to abolish the Board of Health and have a commissioner appointed with powers. Another faction will introduce a bill to virtually abolish the Board of Public Works and Health Board, and give the powers of both into the hands of five commissioners together with a million of dollars to be expended in two years. Save that the Board of Health lost its reputation, if it has ever had one, there has been just one thing wanting for several years and that is the million dollars, or perhaps better two millions, to be expended in sewerage, street repairs and other sanitary improvements.

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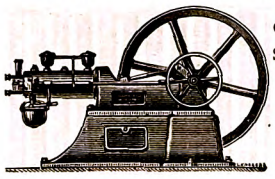

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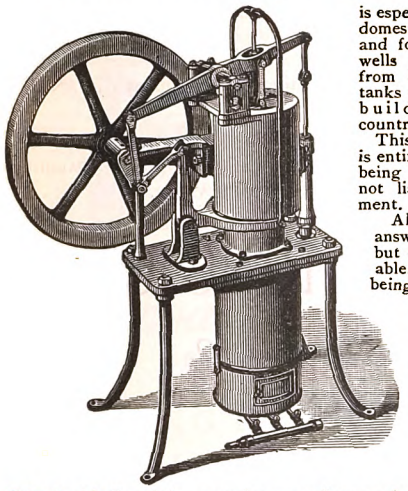

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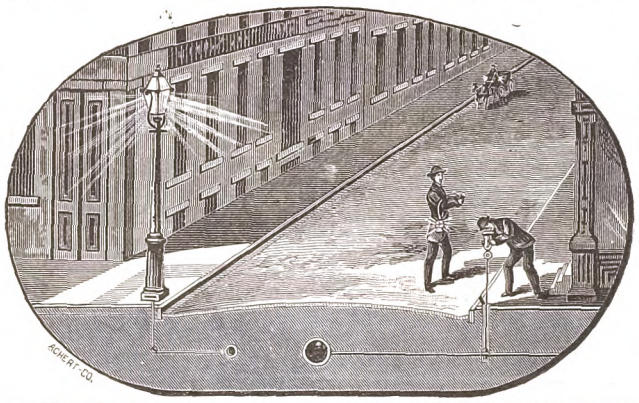

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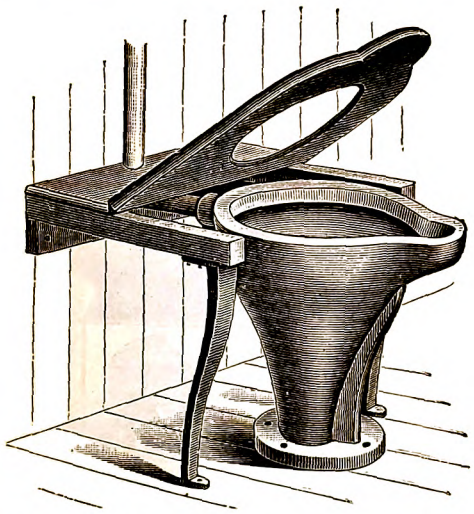

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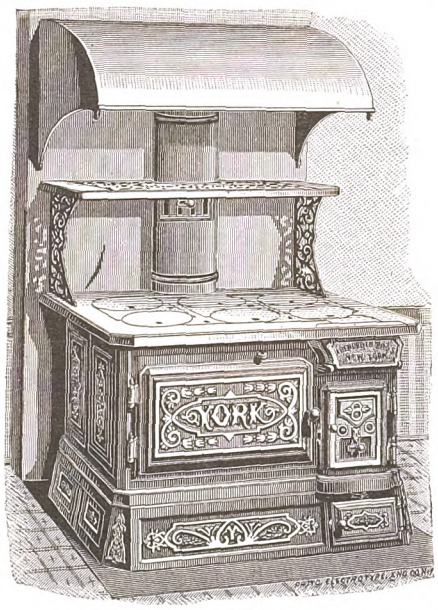

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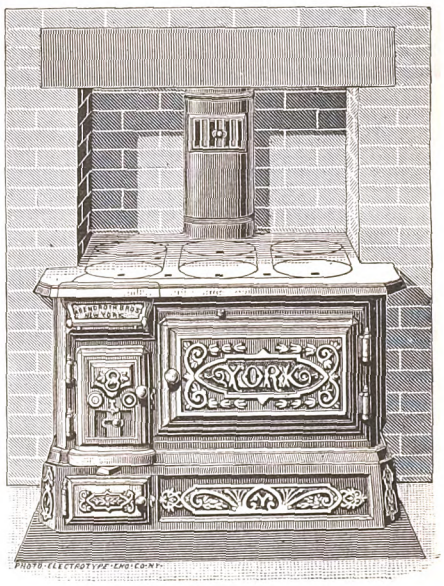

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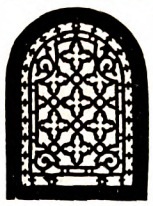

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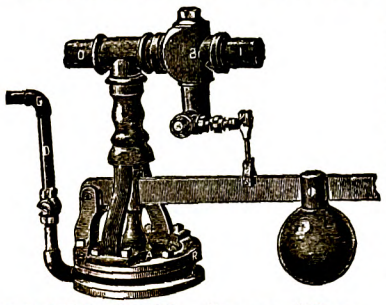

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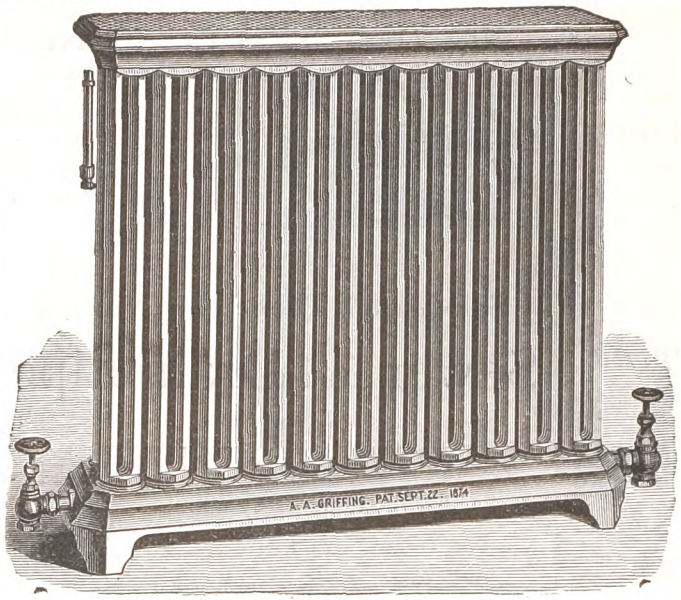

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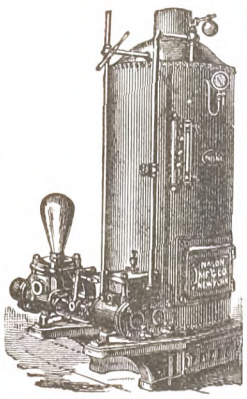

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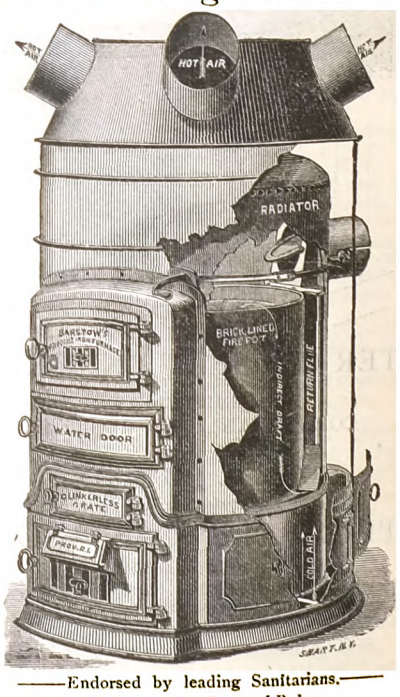

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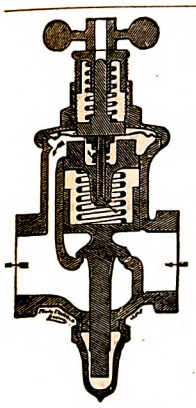

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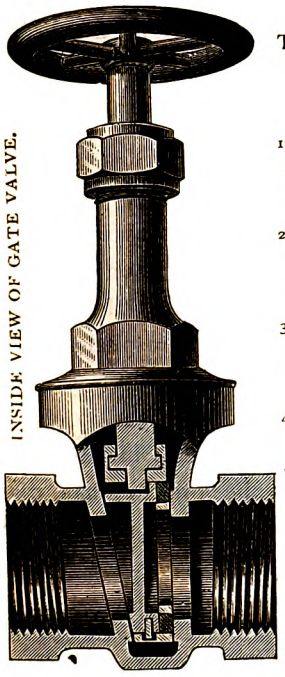

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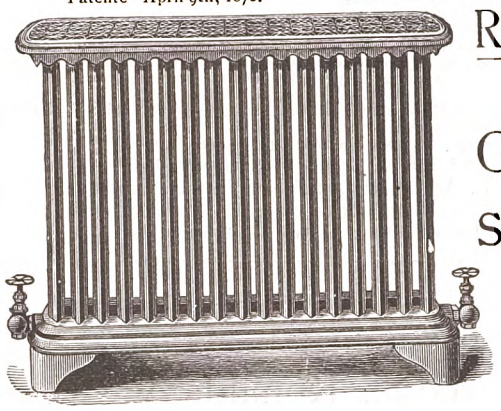

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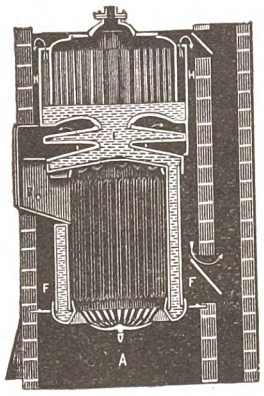

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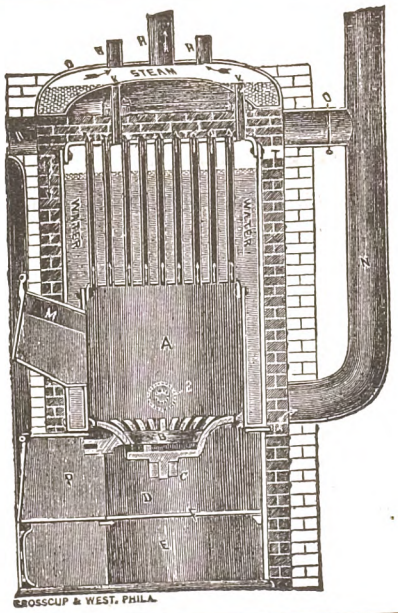

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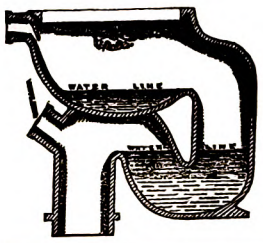

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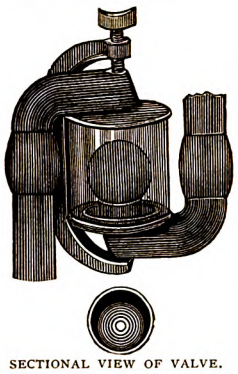

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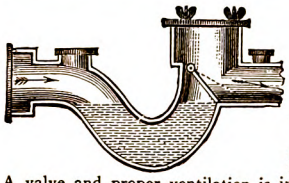

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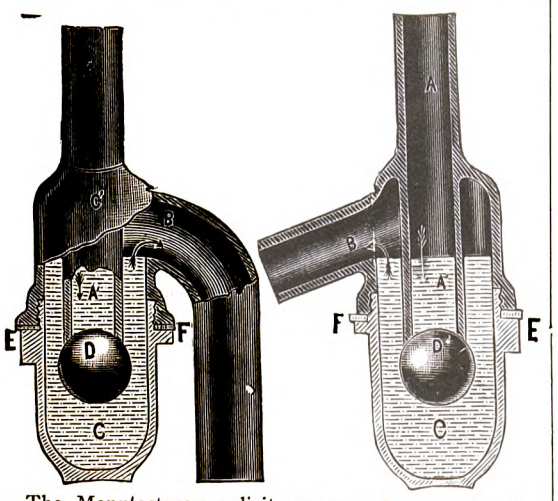

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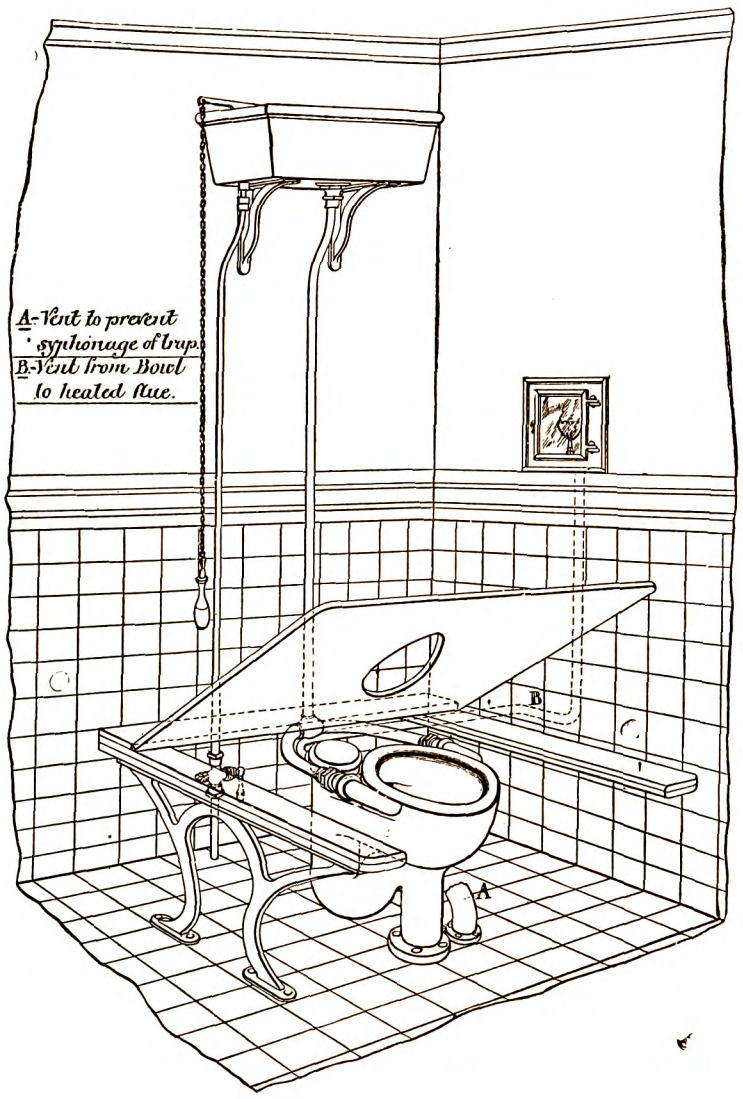

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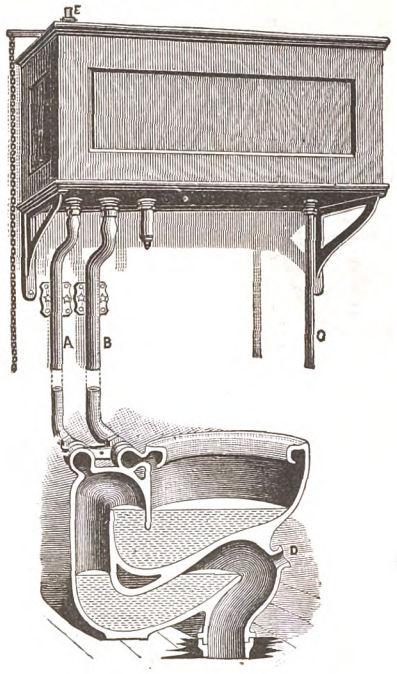

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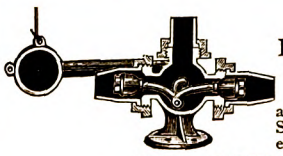

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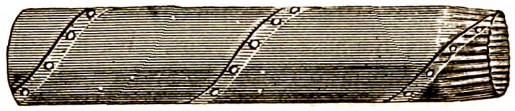

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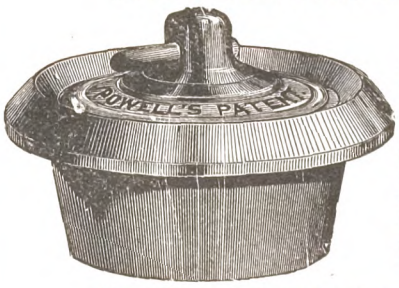

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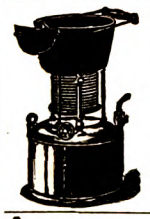

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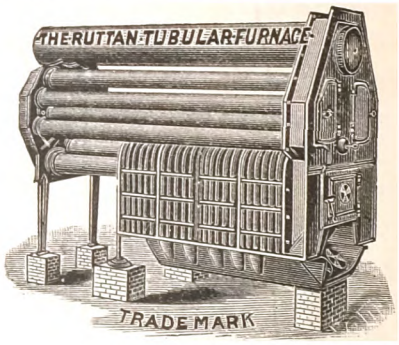

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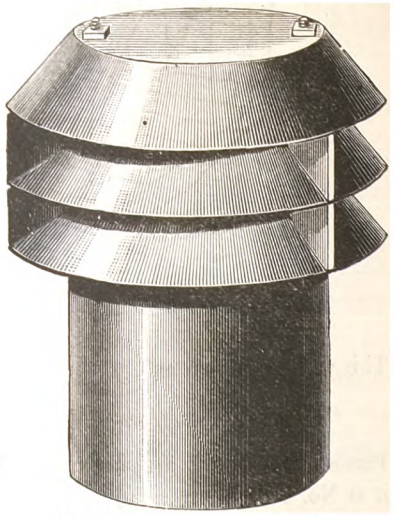

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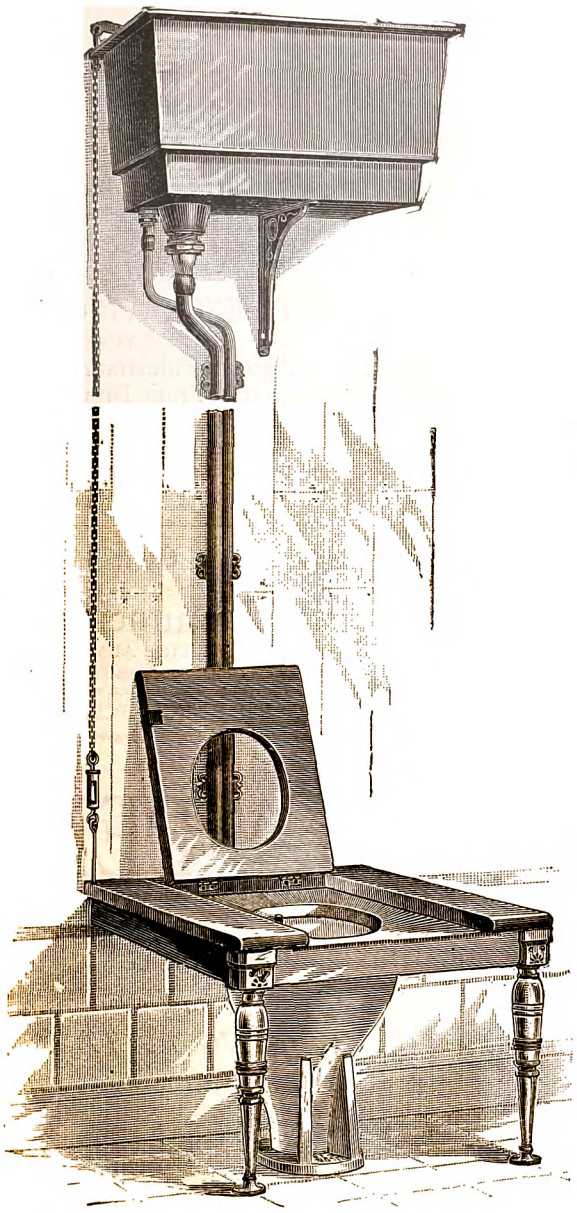

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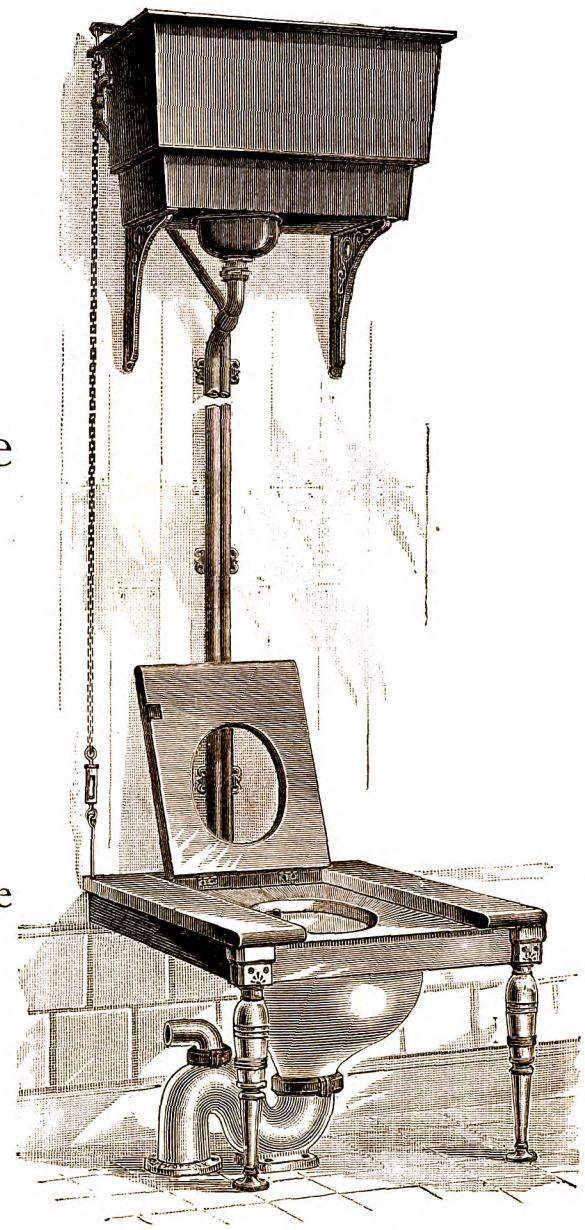

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INUNDATIONS AND THE PUBLIC HEALTH.

Our readers are, no doubt, familiar with the descriptions of the recent overflows in the valley of the Ohio River, and have noted with satisfaction the despatches which announced the turn of the tide and recorded the inches of hourly fall as they had previously done for the rise.

The destruction of property has been considerable, there has been some loss of life and serious interruptions to business, and now the question comes up, what is to be the effect of this on the health of the inhabitants of the inundated districts? No doubt there will be a certain amount of disease directly produced by exposure and privation during the inundation; but is there anything to fear from the mud and *débris* which is left on the subsidence of the flood? There is very little definite information to be gained from the experience of previous floods of a like character in the Mississippi valley, since this experience has not been recorded; but so far as we know, there is no reason for serious apprehension as to the public health merely from the presence of this mud and *débris* at this time of the year. Two years ago Dr. Chaillé, of New Orleans, endeavored to collect information as to the effect which inundations in the lower Mississippi valley had produced on the health of the localities affected, more especially with reference to yellow fever and the malarial fevers, but he was unable to find indications that there was any special increase of these diseases after such floods, indeed, the evidence seemed rather to point in the opposite direction.

It must be remembered that the dirt that is left by the retiring waters is for the most part composed of particles of alluvial soil, that a very considerable amount of really dangerous and decomposing organic matter is either swept away by the torrent in which it is rapidly oxydised and decomposed, or covered by fresh earth, which is not a bad disinfectant; and, also, that the deposit compels a general cleansing in which much filth is got rid of that was not brought down by the river, and which might otherwise have remained in the cellars, yards and alleys for an indefinite period.

With the exercise of a little energy, therefore, there is every reason to believe that all danger to health from filth deposited by the flood can be removed.

At the same time, it will be well for the citizens of Cincinnati, Louisville, and other inundated communities to remember the "the gods help those who help themselves," and to organize their sanitary work in a proper manner while there is yet time.

THE MEDICAL AND SANITARY DEPARTMENTS OF OCEAN STEAMSHIPS.

English medical journals have recently discussed the above subject from the English point of view, and the prevailing opinion seems to be that it is time that Government took some steps to regulate the Merchant Marine Medical Service. But, however interesting this matter may be to our English brethren, it is much more so to us, for the Atlantic steamers are becoming a most important element in our national life. This is true not only as regards immigrants, of the thousands of whom that annually land on our shores an undue proportion have their health injured during the voyage, but also as regards that large and increasing class of our leading professional and business men with their families, who seek health, rest and pleasure in a summer trip to Europe. Thus far the effort of civil steamship companies seem to have been mainly directed to securing safety, speed and conveniences of the average hotel, and we may presume that the demands on the part of the public for them are those which have been found most imperative. The time is close at hand, however, when it will pay to introduce the latest improvements in sanitary mechanism; to provide effective systems of fan ventilation combined with a proper method of heating, in place of the old fashioned bell-mouth wind tubes, which are generally useless in rough weather when they are most needed; to furnish comfortable water closets which shall be free from the foul odors which, far too frequently, make such institutions a nuisance on board ship; and to provide for skilled and careful sanitary supervision of the whole vessel.

The editor of the *British Medical Journal* remarks that upon Atlantic steamers "hygienic requirements are left pretty much to hap-hazard, or certainly made subservient to all other considerations. The medical officers' sanitary responsibilities are wholly undefined. Each ship has a varying custom, dependent apparently upon the combined opinions of the owners, captain, purser and steward. The surgeon is given to understand that neither captain nor owners require any suggestion from him, and that a policy of non-interference will be the most consistant with his own comfort.

"About fifty dollars per month is the highest salary he can expect. His object therefore is to make as much as possible out of the passengers, and the more sickness there is among them during the voyage the more fees he can collect."

This is all wrong. The surgeon of a great Atlantic steamship ought to be a skilled sanitarian as well as a physician and surgeon, his

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selection should be made with great care, he should be held responsible for the sanitary condition of the ship, and should have the necessary authority to secure such responsibility; and he should receive a salary sufficient to secure the services of such a man, and receive no fees whatever from passengers. Let the travelling American public once understand that one of our transatlantic lines is carrying out this policy and it is safe to say that that line will have more patronage than it can manage, even if it adds five dollars to the price of its tickets. We hope that some of the owners and managers will be shrewd enough to see it.

NEW YORK'S WATER SUPPLY.

No. VII.

THE SUPPRESSION OF WASTE.

(Continued from page 290.)

We have seen that in Manchester the testing of fittings and systematic house-to-house inspection is relied on to prevent the waste of water. Liverpool, however, is a city where remarkable results have been obtained by the use of district meters in addition to the measures employed in Manchester. A full discription of the district meter system as applied and carried out in Liverpool we gave in a series of letters on pages 494, 552 and 586 of Vol. IV.

In the present article, therefore, we shall simply recall the leading facts.

Prior to 1873 Liverpool had an intermittent water supply, the daily consumption being about 29 Imperial gallons (nearly 35 U. S. gallons). When constant service was given the amount delivered ran up to 38 gallons. The then limited amount of water accessible demanded either that constant service should be abandoned and the miserable intermittent supply reverted to, or that the waste should be stopped. In this emergency Mr. G. F. Deacon, the Chief Engineer, devised a meter to be placed on the street mains in the various districts of the city, the main purpose being to indicate whether waste was occurring or not, and if so, whether in buildings or in the mains.

It will be understood, then, that the district meters were relied on to indicate where waste was occurring, and only such places were examined; in other words, the citizens of Liverpool are not subjected to house-to-house inspection, a building not being visited unless the inspectors, by the outside means referred to, ascertain that waste is going on within.

Plumbing work, however, has to be done in accordance with prescribed rules, and the standards adopted for the various kinds of plumbing fittings, together with the system of examination and testing, is not surpassed anywhere.

This is a brief outline of the situation in Liverpool, but those of our readers interested will find a very full description in the articles previously referred to, which, under the circumstances, we do not deem it necessary to repeat. A description of the details of the administration. in the testing office may, however, be interesting.

The permanent testing office force consists of seven men: one superintendent, four assistants, and two laborers. The charges for testing are: for bibbs or taps, two pence each, ball cocks three pence, water closet cisterns, six pence. Every tap is taken apart, no matter who makes it, its seat is examined, also the character of the washer, to see that a good bearing is obtained, also the threads on the caps and spindles—indeed, in all respects it is required to conform to the sample tap that the manufacturer had deposited in the office as his standard, which tap had originally received the approval of the Engineer. When new fittings are submitted for approval which deviate from the recognized articles, the custom is to have them put in use somewhere and tried for a year, the authorities taking the ground that experiments to demonstrate the value and utility of an article should be made without risk to them or to the house owner, and though sometimes a meritorious thing is held back a year, yet by this plan a number of unreliable articles are excluded from use, and wrangles with manufacturers and inventors are avoided. In 1880 the number of fittings that "passed through the testing and stamping department was 83,613, of which the testing officers stamped 71,969, the remaining 11,644 being rejected. in consequence of defects revealed by the tests applied."

Each approved fitting has two stamps, one that is readily visible and one a private mark. The latter was made necessary because dealers were caught counterfeiting the stamp. In the testing of ball cocks, they are required to close against a pressure of 130 pounds to the inch, with the ball not over five-eighths submerged; they are also placed upside down, held shut and subjected to three hundred pounds pressure, to ascertain if the casting is perfect. To save the time of immersing each ball, the resistance in weight is estimated and the submerging test is dispensed with.

They have a scale of weight of the water displaced by the ball when immersed five-eighths in depth, a copy of which we were permitted to take by Mr. Davis, the superintendent, which is as follows:

Diameter of ball.	*Weight of displaced water.*
4½ inches.	18.96 ounces
5 "	25.89 "
5½ "	34.79 "
5¾ "	39 40 "
6 "	44.76 "
7 "	71.08 "
7⅞ "	83.13 "
8¼ "	115.78 "

To ascertain the necessary weight to put on the ball when it is turned upside down to resist the pressure of 130 pounds, they subtract twice the ascertained weight of the lever and ball from the figures in ounces given on the scale.

[To be Continued.]

THE CASE OF THE HOTEL BELLEVUE.

The most celebrated trial involving the sanitary condition of a building, which has yet occurred in this country, that of Mr. James Corey, of the Hotel Bellevue, at Sea Bright, New Jersey, on the charge of extortion, has terminated in the disagreement of the jury, they standing eight to four in favor of aquittal after being out twenty-six hours.

The prosecution in this case resolved itself into the two charges, first, that Mr. Corey, taking advantage of the condition of two members of families of wealthy gentlemen, who were lying sick of typhoid fever at his hotel, extorted five thousand dollars as the price of allowing them to remain in his house; second, that the disease from which the sick persous were suffering was caused by the bad sanitary condition of the hotel, for which they held Mr. Corey responsible.

The defence urged that the sum demanded was only a fair compensation for the ruin of Mr. Corey's business, due to the sickness, and for keeping his hotel open for the invalids after the rest of his guests had fled; and that the fever had not been contracted there, for the hotel was in good condition, but the persons had come to it in invalid state and had afterwards fallen sick.

The trial is interesting to our readers in the light it throws on the second of these points, the sanitary condition of a public resort. The prosecution presented testimony showing that before the hotel was opened the water supply had proved insufficient to flush the closets. Thomas Conroy, engineer of the Hotel Bellevue, testified that, by Mr. Corey's orders, he carried a pressure of steam on the engine too low to pump water up into the tanks which supplied the closets, and that much of the water used in the hotel was taken from a cistern into which leakage from scrubbing the kitchen floors made its way. This witness testified also that the pressure in the pipes of the Long Branch Water Supply Company was not sufficient at times to supply the house. He also testified that Mr. Corey sought to deceive the inspectors of the Board of Health by causing water to be pumped into the tanks on two occasions when their visits were expected, and caused the handle to be wrenched off the door of a closet in which water would not run. The defence cast suspicion on this witness' testimony, on the ground that he had received favors from one of the plaintiffs which prejudiced his evidence.

Further light was thrown on the state of the hotel by the testimony of Dr. Ezra M. Hunt, Secretary of the State Board of Health of New Jersey, who testified that there were no traps between the hotel and the cesspools, that the cesspool air might find its way into the hotel, and that the closets were not properly flushed. Dr. Mathew Field, Examiner in Lunacy, of this city, and at one time connected with the New York Board of Health, testified that he had examined the hotel and was satisfied that the conditions were such as might create typhoid. Dr. E. G. Janeway, also of this city, testified that in his judgment the fever must have originated at the hotel. Further testimony by employés was given to show the filthy appearance of the cistern from which the supply of water was at times derived.

For the defence was offered the testimony of William H. Cooper, a plumber, who stated that he had been ordered to do the plumbing work without regard to expense, and considered it as good a job as was done anywhere. Mr. James C. Bayles, of this city, testified that he could give no suggestions for improving the plumbing. Mr. Corey himself testified that the hotel was in good sanitary condition; and Dr. D. M. Forman, of Freehold, N. J., said, that in his opinion the fever was not due to the condition of the hotel. Other evidence was offered to show that no offense had been created when the cesspools had been opened for cleaning, and that the hotel was properly cleaned and cared for.

It is thus evident that the weight of testimony is decidedly to show that the Hotel Bellevue was not in safe condition—was, in fact, in so unsafe condition, as, in the opinion of several medical experts, to be sufficient to propagate typhoid fever. The important question is therefore offered by it, to what extent the courts and the juries will hold a landlord responsible for the condition of his house? The failure of the jury to agree leaves this point open, so far as this case is concerned. We hope, therefore, that at a new trial, the question of the liability of the owner and the tenant, the latter being in this case the landlord, may be defined.

The Bill introduced by Senator Adams, to establish a State Board of Health and a system of Registration of Vital Statistics for the State of Pennsylvania, was defeated in the Senate Legislature on Feb. 27. There were 22 votes in favor of the bill and 16 against it, thus failing of the majority required by the Constitution. The opposing vote was cast by 11 democrats and five republicans.

The opposition was mainly democratic, and on the ground that the Board would be a sort of commission with powers which would make it dangerous.

The result is much to be regretted. It is certainly time that the State of Pennsylvania was provided with some competent authority to enforce registration of vital statistics, collect reliable information as to preventable causes of diseases in the State, and to coöperate with other State boards of health.

The bad boy who produced a sewer gas scare by scattering limburger cheese about the house, has been rivaled by the pupils of a lady's school in this city. An examination was coming on, several of the young ladies were not prepared for it, and accordingly they put their heads together to devise a scheme for preventing its holding. One suggested that a sewer gas scare would be about the thing, and accordingly the fellow conspirators scattered limburger plentifully through the desks. The odors which resulted convinced the principal that there was something fatally wrong about the sanitary arrangements of the building, and the examination was indefinitely postponed. If the proverb be true that it is not all gold that glitters, it is equally true that it is not always sewer gas that gives out the penetrating odor.

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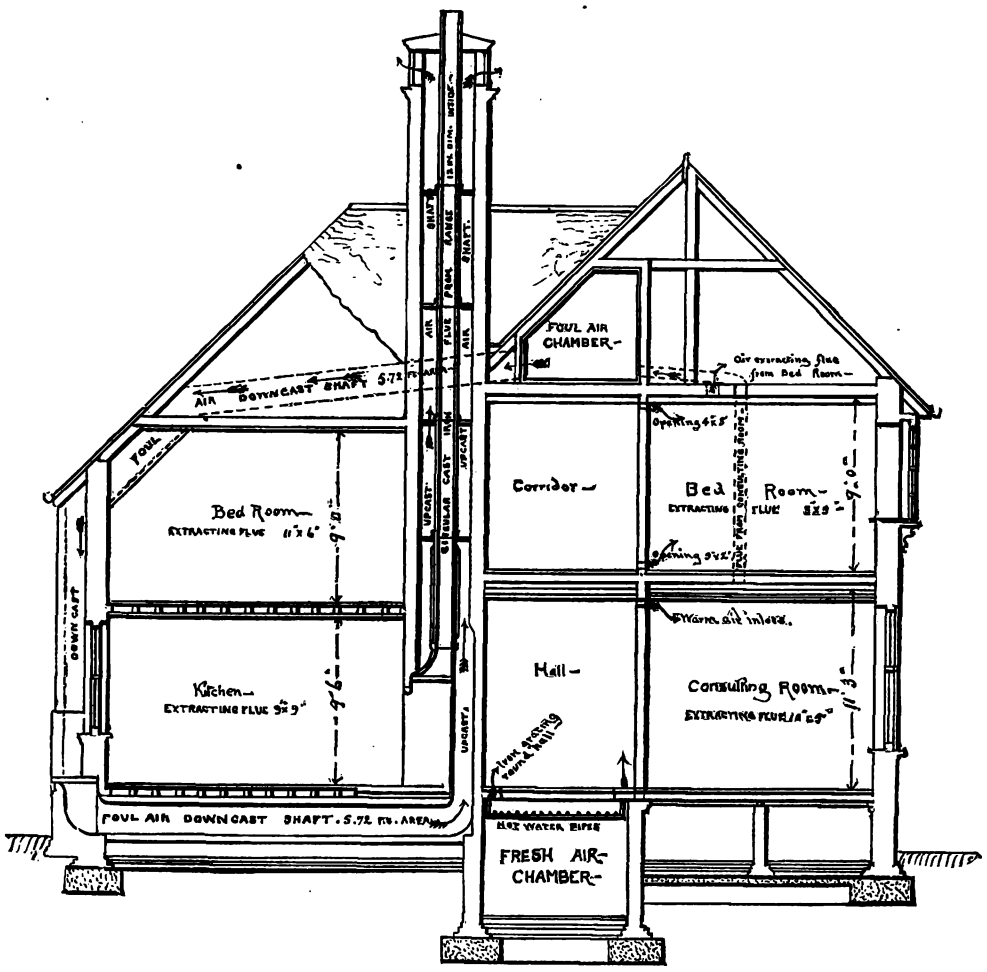
THE VENTILATION OF A DOCTOR'S HOUSE.

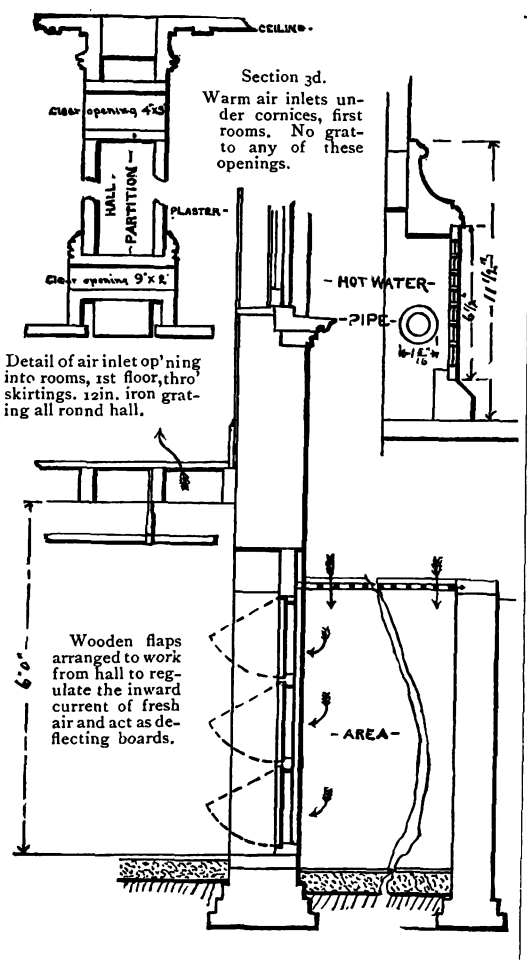
The following description, from *Building News*, with the accompanying illustrations, will, we think, be of interest to our readers. It should be borne in mind, however, that the provisions for heating contemplate the climate of England, where such low temperatures as we are accustomed to do not prevail.

The general arrangements of this house are founded upon the principles laid down by Drs. Drysdale and Hayward in "Health and Comfort in House Building," 1876; the whole of the rooms being under one system of ventilation, and the warming practically effected by one heating stove in the basement. The fresh air for the whole house enters by the large area at the end of fresh-air chamber, under the ground-floor corridor; the sitting-rooms are supplied with air through the large arched openings, which will be closed only by curtains, and the fresh air for the first-floor rises up the staircase and enters the various rooms through openings in the skirtings and cornices. This general supply of fresh air is entirely under control at the primary outlet (detail No. 1), where it can be checked or increased, purified, warmed, or cooled at pleasure. It will at first pass through canvas or some additional permanent air-cleanser as found necessary. In winter, the fresh air will be warmed by passing up between close rows of hot-water pipes heated by a stove in the basement; and by this means, and an additional hot-water pipe running round the two nurseries, it is found that every part of the house can be warmed to a pleasant and even temperature. In summer the air will be cooled by passing through water-cleansers or over ice. From each room in the house an extracting flue is carried separately, and as directly as possible into a foul-air chamber in the roof; from this chamber, a large extracting or downcast shaft is carried across in the roof, down the outside of an external wall, under the kitchen floor and up behind the kitchen range. It is at this point that the motive power for the air throughout the house is supplied by the waste heat from the kitchen-fire; by the arrangement shown in detail No. 2, the foul air comes in contact with the boiler plate behind the range, and minimum velocity in the extracting flues of 200 feet per minute. The use of open fireplaces is not at all against the proper working of this system of ventilation, and in this house they have been built with smoke-flues, but are temporarily bricked up, as they will not be used at first. They may be found desirable, and even necessary, as a matter of sentiment; but the house can be warmed without them. All unnecessary projections for the settlement of dust and dirt have been avoided inside the building, the architraves of doors and windows having no projection beyond the face of wall, and the plaster cornices having very small members. The heating and ventilating arrangements have been carried out entirely at the owner's desire.

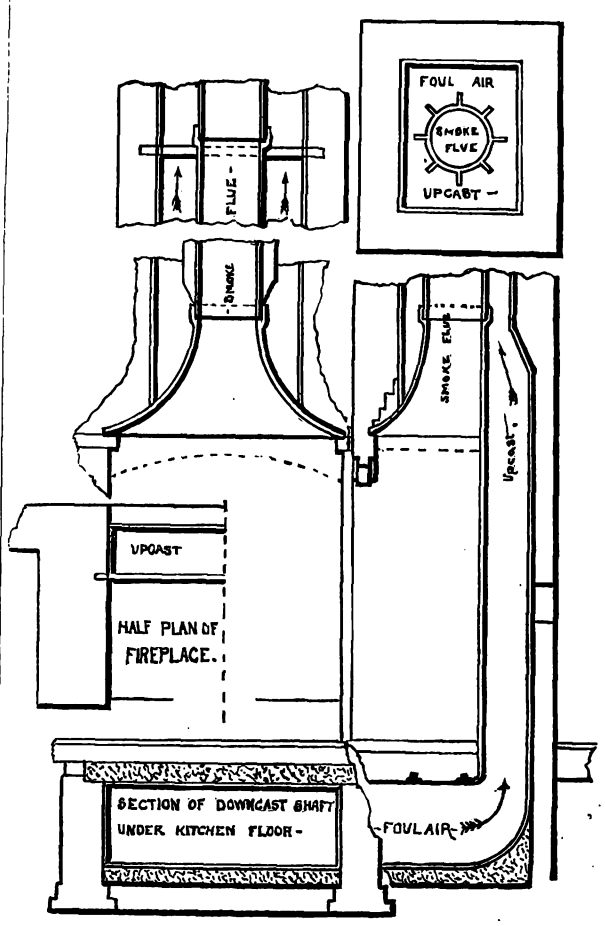


Contents of fresh air chamber	1,530	cubic feet.
Length of hot water pipe in chamber	540	feet.
" " " round nurseries	110	"
Amount of air in rooms, corridors, etc.:		
Ground floor	18,832	cubic feet.
First floor	16,386	"
	35,218	"
Contents of foul air chamber	293	"
Area of downcast foul air shaft	5.72	sq. feet.
Area of upcast foul air shaft	3.81	"

No windows open, all being fixed and made air-tight. Each apartment—sitting rooms, bed rooms and closets—has a separate zinc extracting flue direct into foul air chamber in roof. Each flue is in size *in proportion to the cubic contents of the particular room the flues all enter.* The foul air chamber at same level, about 2 inches from floor. There are no gratings at all to the openings, or anywhere in these flues. York stone covering to slope of downcast shaft.



No. I.—Section through Primary Air Inlet.



No. II.—Kitchen Fireplace, showing means of Producing Current in Foul Air Upcast Shaft.

The London *Times* publishes an account of the measures taken by the Westminster Sanitary Aid Association, to prevent the spread of epidemic diseases. When information of the occurrence of an infectious illness is received through dispensary doctors, sanitary inspectors, school authorities, or others, the sanitary visitors of the association go to the house and take steps to insure the use of disinfectants, and, as far as possible, the isolation of the patient. Where complete isolation is possible, and it is too late to remove the patient to an hospital, extra bedding, sheets, and blankets are lent for the use of other members of the family, so that the sufferer may not have to sleep with those as yet unattacked by the disease. A small house has been taken in which two rooms are available for the reception of poor people during the time necessary for the proper disinfection of their own lodgings, and where an unaffected member of a family in which a case of infectious disease had occurred might be lodged, so that the means of livlihood might not be lost or the infection spread. Here, also, clothing and other things are received, and disinfected. As proof of the success of the measures taken by the association to prevent the spread of infectious diseases, it was mentioned that in only four cases had they been unable to confine the illness to the individual patients already attacked.

The Government of India causes a sanitary primer to be used in the schools. One hundred thousand copies of the publication have been circulated in fourteen different vernaculars.

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HOW THE PLUMBING LAW IS ENFORCED IN NEW YORK CITY.

The following description of the methods employed by the Health Department of this city, in the enforcement of the plumbing law will be found especially interesting at this time when similar regulations are being agitated and adopted in other cities, particularly to the officials entrusted with the execution of such regulations. For the information required in the preparation of this account we are indebted to Mr. John C. Collins, who has charge of the plumbing plans and specifications.

The law in question was passed June 4, 1881, and took effect immediately. In brief, it requires that the drainage and plumbing of all buildings, both public and private, shall be executed in accordance with plans previously approved by the Board of Health, and grants to any court of record or any judge or justice in the city the power to restrain by injunction order the further progress of any violation, or of any work upon or about the building or premises upon which the violation exists. It also requires the registration of every plumber at the Health Department. The full text was printed in THE SANITARY ENGINEER of June 15, 1881, Vol. IV., page 327.

In accordance with this law rules and regulations were prepared by the Board of Health setting forth the plan of drainage and plumbing approved by them, issued in pamphlet form and distributed among plumbers. The substance of these rules and regulations, in the form of a specification required to be approved by the Board, is given in THE SANITARY ENGINEER of Dec. 14, 1882, Vol. VII., page 34.

To see that these regulations are carried out, five inspectors are employed, each of whom has charge of one of the five districts into which the whole city is divided. Before beginning the construction, owners are required to submit plans of proposed buildings to the Bureau of Inspector of Buildings for approval. A list of these projected buildings is printed every week in several papers. This list is utilized by the Health Department to secure the enforcement of the law requiring the submission of a plumbing plan for every building containing plumbing, as follows: A scrap book is kept in which this list is pasted as soon as it appears. The inspectors have access to this, and each puts his initials opposite every building proposed in his district and enters it in his note-book. Also, on the same day this list is received the following circular letter is mailed to the owner of every projected building.

HEALTH DEPARTMENT, NO. 301 MOTT STREET.
New York,..... 188

To.....
.....
SIR: Plans for a new building at
No..... .....
having been filed by you in BUREAU OF INSPECTOR OF BUILDINGS, your attention is respectfully called to Section 3, Chapter 450, Laws of 1881, which requires that the drainage and plumbing of all buildings—public and private—shall be executed in accordance with plans previously approved in writing by the BOARD OF HEALTH.

Before commencing any part of the work of drainage or plumbing of the above named premises, you are required to present the plans and specifications for the same to this Department and obtain the approval of this Board. Blank specifications and all necessary information may be obtained at this office.

Builders are especially cautioned against *laying drains* to connect with the street sewers, without the previous approval of the Board of Health.

By order of the Board of Health,
EMMONS CLARK, *Secretary*.

If this notice is not heeded and any work on the drainage or plumbing is begun without submitting a plumbing plan the fact is reported by the inspector of that district, and notice of violation is issued and served personally on the owner. If this is not heeded after a reasonable time, the matter is referred to the attorney of the Board who obtains an injunction on the house restraining further work. It is, however, very seldom necessary to take this measure.

The principal plan required for the plumbing and drainage is an interior elevation showing the position and arrangement of fixtures with the traps, and waste and ventilating pipes. A ground plan is however required where the run of the house drain is not direct to the sewer or there is anything peculiar in the arrangement of the drain. Duplicate specifications (blank forms of which are furnished by the Department), are required to be filed with the plans. One copy is retained on file at the Department and the other, when the plan is approved, is returned to the owner (or architect), with the written approval of the Board endorsed on it, and the conditions or amendments imposed being stated in detail. This is designed to be turned over to the plumber to be used by him in doing the work.

The plans and specification are carefully examined by the clerk in charge as soon as they are handed in, and an analysis made of them. They are then numbered and entered in the record book, with the name and address of the owner, builder and architect, and the class of buildings to which it belongs—whether tenement or private house, factory, stable or some other. The plan then goes before the Board with specification and analysis. It is examined carefully by the Commissioners and passed if approved. If found defective in details only, it is "tabled for amendment," the Commissioners having indicated what changes are necessary; the owner is notified and sends in and makes the necessary changes and gets his approved copy of specifications. When the plan and specification contain some arrangement contrary to the rules and regulations, it is approved conditionally, the conditions of approval being stated in detail upon the specification. But if it is found radically defective, it is disapproved and the owner is required to submit new plans.

Lists of the plumbing plans approved by the Board of Health are published in the *City Record*. These are also clipped and pasted in the same scrap book as the lists of projected buildings. From these the Inspectors get the plumbing plan numbers, which they enter in their note books opposite the buildings, the location of which had been previously taken from the list of projected buildings. This enables the Inspector to determine by a glance at his book whether a plumbing plan has been filed and approved for any given house in his district.

One of the conditions of the plumbing specifications requires the plumber to send a notice to the department when the house drain and sewer will be ready for inspection. This notice is forwarded to the inspector, who keeps a constant oversight of all the houses in his district from the time they are commenced till the plumbing is complete, visiting each house many times. Any defect or failure to comply with the plans and specifications discovered by him is made the subject of a special report to the Secretary of the Board (on a blank provided for the purpose), specifying in detail the nature of the violation, care being taken in framing the report, so that the same may be used by the attorney as evidence if the violation is not removed. The following notice is then made out in duplicate:

HEALTH DEPARTMENT, NO. 301 MOTT STREET.
New York,..... 188

Notice of Violation.

....
.....
SIR: It has been reported to this Board that the plumbing work now in progress in the .....house....in course of erection at..... .... is in violation of law and the Plan and Specifications (No.....) heretofore approved by this Board; and you are hereby notified that unless the said plumbing is made to conform to said plan and specifications within... .... days, from the date of the service of this notice, the case will be referred to the attorney of the Board to enforce the law.

Respectfully yours,
EMMONS CLARK,
Secretary.

Following the above, at the bottom of the same page of the notice, is an extract from the law comprising the two most important sections. One of the two copies is then affixed to the inspector's report and given to the officer who is to serve the other. The officer reads to the plumber the inspector's report, after giving him the duplicate notice of violation, and returns the other with his endorsement of personal service and the date. At the expiration of the specified time allowed for the removal of the violation, the inspector visits the place, and if he finds it removed he so endorses the notice, and if it is not removed he so endorses it. In the latter case it is referred at once to the Board's attorney.

At the time of issuing the notice of violation, an entry is made of it in the "Violation Book." The entry includes the inspector's name, the plan number, the location and number of the buildings, the number and date of issue of the notice, the owner's and plumber's name, the date on which it is referred to the attorney, the record of proceedings and final disposition of the case. These are arranged in columns. The book is constanly referred to instead of handling over the papers, and is used in making up statistics, etc.

The plumbing plans and specifications of all buildings are filed in numerical order at the department, and to these the inspectors can quickly refer (having the plan nnmber in their note-books of every building in process of construction in their district), and learn whether the work in any building is being done in accordance with the plan as approved. Each inspector submits a weekly report, stating the number of buildings in his district in progress, the number containing plumbing, the number of inspections made, etc. From these and from office records, the Secretary makes a weekly report to the Board, stating the number of plans filed, the number approved, the number found radically defective, the whole number of buildings in the city commenced during the week, and the number in progress, the number of violation notices issued, the number of cases referred to the attorney, etc.

After an inspector has made his final examination of a building and found everything satisfactory, he fills out the following blank:

HEALTH DEPARTMENT.

Inspector's Report on Plumbing and Drainage.

Location.....
No. of Houses .....Plan No.....
Dates of Inspection.....
Sewer Connections: Is each house separarely and properly connected with street sewer?.....
House Drain: Has it a proper fall?.....
Material?.....
Is it coated inside and outside?.....
Is it trapped?.....
Drain Trap: Location?.....
Has it a hand-hole with proper cover?.....
Fresh Air Inlet: Material?.....
Diameter?.....
On which side of trap?.....
Where does it open?.....
Soil and Waste Pipes: Is each properly connected with house drain?.....
Are they of iron and coated?.....
Diameter?.....
Thickness?.....
Height above roof?.....
Are all joints lead caulked?.....
Diameter of branches?.....
Traps: Is each water closet, sink, basin, wash tray, bath, and tub or set of tubs separately and effectively trapped?.....
Trap Vent Pipes: Material?.....
Diameter for water closets?.....
Diameter for traps of other fixtures?.....
Diameter of branches?.....
Is each trap connected with a separate vent pipe extending above roof.....or tapped in above highest fixture?.....
Height above roof?.....
Diameter above roof?.....
Connections: How made?.....
Safes: Material?.....
How drained?.....
Refrigerator Wastes: Where discharged?.....
Are pipes arranged for convenient flushing?.....
Water Closet Cisterns: Is each water closet or set of water closets provided with?.....
Are they adequate and properly arranged?.....
Where is overflow discharged?.....
Is water supply adequate?.....
Is there a pump?.....
Is a pump necessary?.....
Cisterns for drinking water: Material?.....
How lined?.....
Overflow, where discharged?.....
Leaders: Location?.....
Where discharged?.....
If in house drain, are they trapped?.....
Material?.....
Steam Exhaust: Is any connected with soil or waste pipe?.....
Cellar: How drained?.....
Cellar Walls: Are they impervious to dampness?.....
Cellar Floor: Material?.....
Is it impervious to dampness and gases?.....
Yards and Areas: How drained?.....
General: Quality of material?.....
Workmanship?.....
Have all pipes sufficient fall?.....
Will pipes and fixtures be so exposed as to permit ready inspection in future?.....
Roof: Distance of openings of soil and vent pipes from windows and shafts?.....
Remarks:.....
.....
.....
.....
Ass't Sanitary Engineer.

This is filed with the specification as a record of the plumbing and drainage of the house and, in connection with the plans, furnishes any one who will take the trouble to inquire for it at the Health Department with a description of the work done in any house. This information is frequently sought by parties looking for a healthy home.

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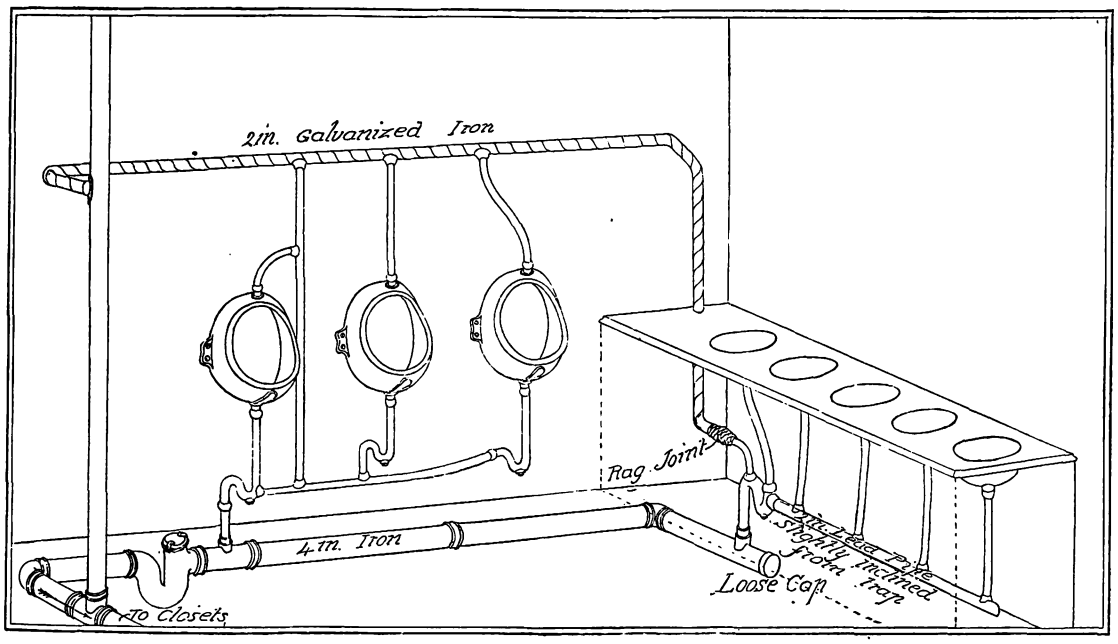
VERY BAD PLUMBING IN A FACTORY.

The following interesting plumbing work in the new factory of the New York Wood Turning Company on 134th street, east of Lincoln avenue, was discovered some weeks ago by Mr. Hooper, Plumbing Inspector of the Health Department of this city. His report was verified by our representative, who visited the premises before the work had been altered and made the accompanying sketch, which does not need much explanation to make evident the stupidity of the arrangement. The 4-inch iron pipe under the urinals was almost exactly horizontal, while the waste pipe under the basins inclined slightly in the wrong direction, so that it would remain full. The basins were not trapped separately, but had direct connections with the horizontal waste.

The arrangement of ventilating pipes was such, it will be noticed, that the 4-inch horizontal waste pipe was connected directly with the air of the room through the urinals. The 4-inch vertical pipe, with which the galvanized iron ventilating pipe is connected, goes up through the roof, for ventilation only. Beyond it are four or five water closets on the same line of drain, which then passes direct to the street sewer through a running trap, which had no fresh air inlet except a trapless rain-leader between the main trap and the closets. A pipe had, however, been taken from the *sewer side* of the trap to the sidewalk, but



this had been plugged up. The above conveniences are on the basement or cellar (ground floor), and are for the use of the workmen.

In a room adjoining the office on the street floor was another equally stupid arrangement. The fixtures here are on another line of drain which has a separate connection with the sewer. As the building is a one-story structure, and there are no fixtures above these, the vent from the water closet trap had been taken into the soil pipe by a short connection. *Into this connection was branched the ventilating pipe from the top of the urinal*, only three or four feet away. The book-keeper said he had noticed a bad odor and had poured water into the urinal to restore the seal of the trap, thinking it might have been lost, seeing no other way in which "sewer gas" could get into the room.

There were other things almost as bad in the girls' room, but we think the above is sufficient. This work was not done by a licensed plumber, but under the direction of the superintendent of the factory, by a young man, almost a boy (who, however, seemed to be a good workman, made good joints, etc.). When a Board of Health Inspector pointed out the defects to the superintendent, and told him what changes must be made, he seemed quite willing to make them and anxious to have everything properly done. The changes recommended have been made, we understand, but not without some difficulty. The interesting question here comes, in who violated the law, the boy or the superintendant? In other words, who assumed to be the plumber? It does not appear that either was was registered.

The Paris Academy of Medicine offers a prize of $5,000 to anyone who may discover a remedy against diphtheria.

THE HEATING AND VENTILATION OF A SCHOOL BUILDING.*

The location and exposure of a school building are of importance in connection with its heating and ventilation, partly in relation to the purity of its air supply and partly because the winds have a much greater effect upon the movements of the air *within* a building than is ordinarily supposed; and this is especially the case in a building constructed of ordinary brick and mortar, with common plastered walls, not painted, papered, or calcimined, which is the case with our ordinary school buildings. In a building of this kind, freely exposed to a strong wind, there is a very decided movement of air through the windward side, and a corresponding tendency to an exhaust through the opposite side. This tendency is sometimes so strong that the openings on the leeward side which were intended for inlets of fresh air to the heating surfaces have their action reversed, and will be found acting as outlets, in which case it is by no means impossible that what were intended to be foul-air flues for the building will be found to be acting as inlets, as I have actually seen the case in a school building I examined.

The location and exposure should be distinctly noted, including the altitude of the site, the distance of surrounding buildings, the prevailing winds, etc. The vicinity of marshes, pools of stagnant water, and buildings in which trades and manufactures liable to give forth offensive emanations are situated, should also be noted. The plan of the lot should be given, and upon it should be located the building, giving dimensions, so as to indicate distinctly the amount of ground not covered by the building and the location of drains, sewers, and cesspools outside the building, but connected with it. The next thing is to prepare copies of the floor plans of the building, with a section showing the height of the several stories. The dimensions of all windows, doors, and flues should be noted; also the existence of transoms over the doors. The amount of clear opening in the registers for each flue should be indicated, together with the number of desks and the number of children actually in the room at the time of making the observation. The length of time which these children have been in the room since the last recess should also be noted. The temperature of the outer air and that of the room near the floor and near the ceiling, within two feet of the inner wall and in the same position relative to the outer wall should be taken; also the temperature of the incoming and outgoing air. This is necessary to enable one to judge of the distribution of heat in a room, and to a certain extent is a very good index of the distribution of the fresh air. It is also desirable that the amount of moisture in the air as determined by the hygrometer should be observed and recorded, similar records being taken of the amount of moisture in the external air. The next step is to ascertain the amount of air which is actually entering and leaving the room by the special openings and flues provided for that purpose. This is to be done by means of an instrument called an anemometer In making such observations it will be found that there is a great difference in the amount of air passing through the several flues, dependent on the direction and force of the wind, and also to a great extent as to whether the doors, and the transoms over the doors, of the school rooms be opened or closed. In a school building of several stories, where the doors open into a large central hall containing a staircase, which is a common plan of construction, it will usually be found that a large proportion of the change of the air in the school rooms is effected through the doors and transoms, and outward and inward currents will be found in the doorways near the floors and at the top of the openings.

It would be a great error to suppose that only the amount of fresh air indicated by the anemometer in the flues provided for that purpose is actually entering the room. Were this the case, a great majority of school rooms would soon become uninhabitable. As a matter of fact, a very large amount of fresh air enters directly through the walls, another part around the windows and through cracks at the junction of the floor and wall and a third source of supply comes from the central hall, as just indicated.

Although the anemometer is a comparatively simple instrument, there are, nevertheless, one or two precautions necessary in its use, to which it may be well to call attention. In the first place, the accuracy of the instrument should be carefully tested, not only when it is first received but at intervals subsequently. The usual mode of testing is to swing them in a circle at the extremity of a bar of a known length and note the registration. A simpler method is to walk rapidly a measured distance, say 200 feet, in a covered space, where there are no currents of air, holding the instrument at arm's-length above the head, or, better, attached to a short rod, with the plane of the wheel perpendicular to the direction of the movement. It is difficult to ascertain precisely the amount of air flowing through a register by the use of the anemometer, if the instrument be merely held in front of the register. The best way is to cover the entire register with a sort of truncated cone, made of light board or pasteboard, freely open at both ends, and having the large end fitting close against the wall over the register, the smaller end having, for convenience of calculation, an area of one square foot. This cone should be from one foot to 18 inches high.

I must warn you against the error of supposing that all the air coming from the top of a heating apparatus placed in the room itself and connected with the outer air is to be counted as fresh air supply. In all cases a very considerable amount of this air is derived from the room itself, and rolls up along the side of the heating apparatus, be it ventilating stove, steam coil, or what not, and aids in forming the current which the anemometer shows to exist over the radiator. In all such cases the true amount of air which is entering from without can be found by testing the current with the flue from the external air closed and then open, and noting the difference.

Nor can the amount of air entering at the inlet flues or found to be passing out of the outlets be taken as an absolute indication of the amount and character of the ventilation of a room, for it is possible to pass a very large amount of air through a room without really ventilating it, and this will always be the case where the air is admitted at a high temperature and allowed to escape through openings at or near the top of the room. It is necessary therefore to obtain some information as to the distribution of the fresh incoming air as well as its quantity. This information is to be obtained partly by the use of visible vapors, or light substances which will indicate the direction and force of the air currents, and partly by chemical analysis.

Of the various means of showing the direction of air currents, one of the simplest is by the fumes of freshly generated muriate of ammonia produced by bringing the vapors of the common liquor ammoniæ of the shops in contact with the vapor of hydrochloric or muriatic acid. These fumes can inhaled without discomfort or injury; in fact, they are sometimes used for the treatment of chronic inflammatory troubles of the air passages. The cost of their production is very small and they can be generated in any amount desired. Even these, however, give but a very partial idea of the distribution of the air within a room. This can only be ascertained by taking samples of the air at different points in the room and subjecting them to chemical examination. I wish to emphasize here the fact that carbonic acid gas, in the proportion in which it is found in the worst ventilated school rooms, is not in itself poisonous, offensive, or harmful. The really dangerous and offensive impurities are the organic matters thrown off in respiration, and as these increase the carbonic acid increases in like proportion. Now, the testing for these organic matters, in a quantitative point of view is a very difficult and delicate process, whereas the examination for carbonic acid is, as you will see, comparatively simple; hence, the chemical test of the quality of the air is made by the analysis for carbonic acid, which is taken as an index for the really harmful impurities existing.

If the water closets are placed in the basement of the school building, in a room having a cemented floor, for purposes of cleansing, it is very common to have this floor slightly sloped towards one point, and at that point to place an opening into the sewer so that the whole floor and closets may be washed by means of a hose, and the resulting water readily gotten rid of. This opening to the sewer is usually guarded by means of what is called a bell trap, which is, however, in nine cases of ten found to be totally ineffective. In two out of three cases in which I have recently examined these arrangements in Washington schools, I found a strong current of air from the sewer passing up from this so-called trap into the basement, from which it passed freely up the staircase into the main hall, and became a part of the source of supply for the school rooms, as I have already explained.

If the closets are placed within the building, it should be noted whether the soil pipe is properly ventilated, that is to say, whether the pipe into which the closets discharge is continued up through the roof and left freely open at the top, and has also a fresh air opening into it from the outside of the building. If the closets be outside of the building the point of discharge of their ventilation pipe should be noted, as to whether it is above or below the level of the windows of the upper rooms in the main school building. A very frequent source of unnecessary contamination of the air supply of a school building is connected with the heating apparatus. This may occur in

* Condensed from a paper read by Dr. J. S. Billings, U.S.A., before the National Educational Association.

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two ways: first, as the heating apparatus is usually placed in the basement, which communicates freely by stairways with the upper hall, any checking of the draft in the fire causing escape of gases from the furnace into the basement will contaminate its central air supply. This is liable to occur, whatever may be the form of heating apparatus. The second mode of contamination is by the air of the basement, rendered impure in various ways, passing into fresh air ducts through cracks, leaks, etc. This is especially liable to occur in systems of heating by hot air furnaces, and the fittings of these should be carefully examined.

As a rule, in all school buildings warmed by the so-called methods of indirect radiation, that is, by hot-air furnaces or by steam coils placed in the basement, the air enters the room at a comparatively high temperature, too high, in fact, for either comfort or health. The only way of controlling the temperature of the room in the way of reduction is to partially or entirely shut off the air supply by closing the register. No heating or ventilating apparatus which operates in this manner can be considered satisfactory. In all cases it should be possible by the operation of a valve to permit more or less cold air to mingle with the heated air, and this should be done in such a way that the temperature of the air admitted into the room can be regulated without at all diminishing its quantity.

A complete idea as to the merits of the system of heating and ventilation of a building can only be obtained by a series of records of the effects produced by it under various circumstances of external temperature, moisture, wind, etc., the amount of coal burned, and the effects upon the health of the pupils. Take, for instance, the records of temperature. These should be taken twice in each school session, once just as the school assembles, and again just before it is dismissed. They should be taken in different parts of the room: at the entrance of the fresh air, at the point of discharge of the foul air, at the level of the children's heads, and on the floor. The most important record, however, is that which relates to the health of the pupils. It seems at first sight somewhat curious that there should be so little scientific evidence obtainable as to the effects of over-crowded, over-heated rooms, and impure air of various kinds upon the health of school children. I have repeatedly found, in going into school rooms, where the air was so impure as to be decidedly offensive to the sense of smell to one entering from the outer air, and where the carbonic acid ranged from twenty to thirty parts in ten thousand, that upon inquiry, the children, or at least a great majority of them, made no special complaint of ill-health, nor was it possible to show from their condition, as observed, that the foul air was having a bad effect upon them. This want of evidence is due in part to the great power which the childish organism has of accommodating itself to circumstances, and in part to the fact that the evil effects of impure air are remote rather than immediate, and show themselves at periods from one to perhaps twenty years after the exposure.

It is so highly desirable that a systematic record should be kept of the health of children and teachers and the results which would obtained from a comparison of such records for a number of school buildings in different cities would be so valuable that it certainly seems worth while to make at least an attempt to obtain them. I am quite aware of the difficulties in the way of making such records complete and accurate in all respects. Nevertheless it does seem possible that when a child is first admitted to a public school a record could be made of its physical condition, including powers of vision and hearing, height, weight, etc., and that thereafter all absence from school on account of alleged sickness should be so noted, as well as the character of the illness, so far as this can be ascertained. In this connection, I would invite your attention to the means used in some investigations undertaken by Prof. Henry P. Bowditch, of Harvard University, respecting the laws of growth in children as shown by investigations made upon school children in Boston.

These data are collected upon cards, of which specimens can be obtained from Professor Bowditch, and of which the following is a copy:

FOR SUCCESSIVE SETS OF OBSERVATION—FEMALES.

Record all linear measurements at nearest centimetre; all weights. at nearest kilogram.

Name (or initials), —— ——; birthplace, ——

	1882	1883	1884	1885	1886	1887
Age ....y. m..						
Height without shoes..cm..						
Sitting height .....cm..						
Finger reach.....cm..						
Chest girth, inspire ...cm..						
Chest girth, expire ....cm..						
Weight (in ordinary indoor clothes) ..... kilo..						

Nationality of father,——; mother,——; paternal grandfather, ——; paternal grandmother, —— maternal grandfather, ——; maternal grandmother, ——.

Color of eyes, ——; color of hair, ——.

Occupation (of husband if a married women) (of parents if a minor), ——.

Name (or initials) of observer, —— ——.

Reverse side.

The height is to be taken in an upright position, without shoes, the feet being close to the measuring rod. If, in the case of infants, it is necessary to measure in a recumbent position, the fact should be stated.

The sitting height is the vertical distance between the top of the head and the surface upon which the individual is seated.

The finger reach is the distance between the tips of the middle fingers when the arms are extended horizontally, the breast and arms being in contact with a wall. The chest girth should be taken after a forcible inspiration, and also after a forcible expiration, the measuring tape being passed horizontally round the chest on a level with the nipples, over only a single garment. This measurement is to be taken only on men and children.

The weight is to be taken in ordinary indoor costume. In the case of children less than ten years of age, it is to be recorded at the nearest tenth of a kilogram.

The color of the eyes is to be recorded as blue, gray, brown, or black.

The color of the hair is to be recorded as fair, golden, red, brown, black or gray. If gray record also, if possible, the original color.

The nationality is determined by the place of birth.

The occupation should be given so as to indicate as far as possible the degree of comfort in which the individual lives.

Separate colored cards are furnished for males and females, and also distinct colors for a single set of observations and for successive sets of observations.

I have satisfied myself that such an account could be kept by the teachers with comparatively little trouble and I feel assured that the results would be of great value. In fact, what we need above all things at present, as regards our public school buildings, is a system of accounts which shall show, not only the cost of their construction and repairs, which is merely one side of the question, but their effects upon the health of the children and teachers who are to spend no inconsiderable time in them. That a comparison of such records would lead to changes and improvements in the plans and methods of construction of school buildings which would be in the direction of true economy as distinguished from cheapness there can be little doubt.

Correspondence.

THE ALLEGED EXPLOSION OF SEWER GAS.

CINCINNATI, O., *Feb.* 27, 1883.

To the Editor of THE SANITARY ENGINEER:

I send you herewith a report of the facts in the case of the Wilstach street explosion, which was to-day forwarded to the Board of Public Works.

From this your readers may judge how improbable it is that sewer gas had anything to do with it. Only one thing is necessary for a full understanding of the situation, which is not explained in the report, and that is the nature of the fills around the house. The streets and the lots in this vicinity are all filled about eighteen feet above the natural surface level, and these fills are made principally with street dirt and ashes, with a large percentage of *garbage* mixed therewith. The house that was destroyed was the last one erected on the north side of the street and was surrounded by these fills.

I might add that the house in question had gas connection, and as an explanation of the water in the cellar without sewer connections, I will state that the streets and adjacent lots were overflowed or flooded by the extreme high water.

Yours truly, A. E. TRIPP.

CINCINNATI, O., *Feb.* 26, 1883.

H. J. STANLEY, *Esq., Chief Engineer:*

The coroner having ascribed the cause of the explosion on Wilstach street, on the morning of the 15th inst, to sewer gas, I submit, for the information of the Board of Public works, the facts in the case:

First, With reference to the sewer in Wilstach street, said sewer is the completed part of a 2' 8" x 2' oval brick lateral to McLean avenue sewer, built from Dalton avenue 425 feet eastwardly, terminating at a catch basin, and with a man-hole near the terminus. There is also a man-hole at its beginning which is temporarily connected with the Liberty street sewer through Dalton avenue. There are six connections with the sewer on Wilstach street, *but the house which was destroyed had no sewer connection.*

Moreover, on account of the depth of the sewer and the stage of the river on the 5th inst (ten days before the explosion occurred), the sewer was on, and from that date, full of water, and any gases it might have previously contained must have been forced out through man-holes and catch basin, or possibly, in part, through its other connections, though these would be filled by the rising water when the sewer was one-half full.

Second, I submit a copy of the record, from the coroner's office, of the verdict and the testimony upon which it was based.

"INQUEST NO. 31:—VERDICT.

"After having examined said bodies and heard the evidence, I do find the deceased came to their deaths from injuries received by fall of building No. 51 Wilstach street, said fall occasioned by the explosion of sewer gas in the cellar of said building.

Signed, C. S. MUSCROFT,
Coroner.

"Mrs. K. Hammel makes oath, and says: I do not know what caused the house to fall. I kept coal in the cellar, and there was water in the cellar. I was unconscious after the house fell.

"H. Richards, Jno. Myers, Mike Sparth, John Collins, and James Farrell, testify to assisting in removing the bodies, etc., nothing about cause (all policemen). Bernard Schutte was in the street opposite the house; saw the boys go into the yard to get something for the raft they were making. Saw a light and heard the explosion.

R. B. Davy, M.D., testifies, that Jake Braun, the one who carried the lamps into the cellar, told him that he went into the cellar with a lamp to get some wood, and that he heard first a hissing noise and then a heavy sound. He said he saw fire flash up and then was stunned.

Jacob Braun, was in the house about ten o'clock Wednesday. I went into the cellar with a light and measured the water; there was about five feet. My wife and I then went to bed. The next thing I knew was when the explosion * * It was a very loud noise. My wife and I were fastened in the ruins. In a short time help came and we were taken out.

John Henry Macke testifies, to being brother of dedeceased.

August Bouman testifies to hearing the explosion.

Henry Korman testifies to seeing the boys go into the * * with a lantern, and immediately after the explosion took place. Saw the house fall. Sergt. Godfrey Pistner helped remove the bodies.

Thos. O'Connor says above is correct.

John Ambrose helped remove the bodies (Patrol Squad)

Anthony Corry says above is correct.

Thomas Finn, policeman, same.

There appears to be nothing in the above testimony pointing to the cause of the explosion, and I think that the above facts with reference to the sewer in the street will exonerate the much abused *sewer gas* from any participation in this disaster.

I also submit an article clipped from THE SANITARY ENGINEER of the 22d inst., a perusal of which, with a knowledge of the nature of the fills in the vicinity of the explosion might throw some light on the question.

Respectfully,
A. E. TRIPP, *Ass't Engineer.*

WASHINGTON MASTER PLUMBERS AND THE PLUMBING REGULATIONS.

WASHINGTON, D. C., *Feb.* 19, 1883.

To the Editor of THE SANITARY ENGINEER:

In your issue of the 8th inst. you published the communication sent you by me by order of the Master Plumbers' Association of this city, and also the regulations governing plumbing in this city (a copy of which I enclosed with the communication).

You proceed to criticise the action taken by the Association in a manner which I do not think we deserve.

You accuse us of complaining "because," as you say, "a restriction is placed on us doing cheap, otherwise, skin work." You say instead of making complaints we should do what we can to sustain the law, and that the time has gone by for any set of men calling themselves plumbers to oppose the enforcement of reasonable plumbing regulations.

This does us injustice. Although in revising the regulations our suggestions have been almost entirely ignored, we have labored to sustain and have them uniformly enforced, which they never have been, are not now, and never will be under the existing state of affairs.

The inspector's time, when he is not in his office, is too much taken up inspecting (by request of tenants) old work over which he has no control, and if the owner consents to comply with the inspector's recommendations, it is generally the case he only has enough work done to deceive the tenant into the belief that the work has been put in a modern sanitary condition, and if the inspector's attention is called to the fact that the regulations have not been complied with, he replies he cannot enforce them on old work. In the meantime, new work, extensions, and extensive alterations, to which the regulations apply, are all being done, with few exceptions, with bad workmanship, and in direct violation of the regulations, both by bonded and unbonded plumbers, and unbonded men who are not plumbers, of which the two latter will soon equal the former in numbers, as we hear of them every day, and they go about and tinker here and there unmolested by the authorities.

We do not wish the privilege of doing skin work, and we do not want to be called skin plumbers because we question the necessity of some of the requirements of some of the clauses which tend to increase the cost of plumbing. For instance, we do not approve of its being made obligatory to build a man-hole over each running trap, at a cost of from twenty-five to thirty-five dollars (although it is undoubtedly the most convenient means of reaching the trap); but when the trap can be made

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sufficiently accessible for ordinary cleaning through the fresh air inlet, why require this expense?

We do not approve the use of iron pipe being made obligatory at an increase of cost from fifty to one hundred and fifty per cent. I believe the principal objection made to terra cotta is that the joints are less likely to be made perfect than those of iron are. We claim that if the inspector performs his duty, and sees that the joints are made tight and the material used be of good quality, the pipe laid on hydraulic concrete to prevent settling, there certainly can be no question of the superiority of terra cotta to any other material for house drains laid in the ground.

There are some other things objected to by men here who certainly are not considered skin plumbers.

We do not oppose the enforcement of reasonable plumbing regulations; quite the reverse, we approve of such, but at the same time we demand that they be enforced, and let not the law makers be the first law breakers, and let them act consistent with the law they make to govern us.

To illustrate how inconsistent with the requirements of one clause of the revised regulations is the action of our commissioner, please note the enclosed printed slip, headed, "Why Terra Cotta Pipes will be Used." Looks all right on the face, does it not? proper enough you will say, as the contract was made previous to the revision of the regulations. But why do they require iron pipe now at all, when they formerly allowed terra cotta? is it because they have concluded the terra cotta cannot be made safe? If so, why will they allow it to be used now, (even though the contract is made) under three school buildings where as yet not a foot of sewerage has been laid? If, in their opinion, terra cotta is not safe, why not pay the additional cost of iron? on the other hand, if terra cotta is safe for these buildings it is safe for all others.

In the meantime, we have a gentleman from the Inspector of Buildings' office (a carpenter and builder by trade, an excellent building inspector), performing the duties of plumbing inspector in place of the regular inspector, who is afflicted by the loss of two children by scarlet fever, and serious illness of the others. Shows the necessity of an increase of the number of inspectors, does it not? Respectfully yours, E. G. L.

[Our criticism was on the action of the Association in endorsing the letter of Mr. Caverly to the *Star* in its *entirety*, without modification or qualification.

The parts to which we took exception were those designating the regulations as "a most unwarrantable exercise of power over private rights;" "plumbing work in the line of luxuries, available only to the rich and well-to-do."

The line of argument as indicated in these extracts, we critised as being the same that skin builders have invariably adopted, and that view we still maintain. The other portions of Mr. Caverly's letter and the Association's endorsement of them we should not have criticised in the same way, though we regret to see these controversies brought before the public.

Our correspondent's defence of the action of the Association is certainly courteous and plausible, though he seems to labor under the apprehension that it is proper to require one kind of work for the rich and one for the poor. This is the idea of men who sell adulterated food—that "the poor can't afford to pay for the pure article." There never was a greater fallacy than the idea that the poor should be permitted to have cheaper plumbing than the rich. In the matter of the needless accessories, elaborate finish and surroundings, they, of course, should not be insisted on; but a well jointed iron house drain, which is indispensable in our opinion, does not come under the head of "luxuries."

If any one can afford to take chances with cheap plumbing it is the rich. Sickness with them does not deprive their families of support. With the wages earner it is a very different thing. The question of per cent. on the cost of a drain should not be considered; indeed, it would have been fairer to have stated what this extra cost would have been in dollars. The assertion that because tile pipe had been used and was permitted up to a certain time, and that contracts made prior to that time were exempted, is no argument against a change if it is thought desirable. In all such matters the line has to be drawn somewhere and from some date. Outside a house the Board of Health of this city permit a tile drain to be laid under certain conditions. When those conditions are fulfilled it undoubtedly makes a good job, though the cost of doing it is fully that of the iron drain.

Now, as to the alleged inadequate enforcement, it is not charged that the inspector neglects his duty, but that he has not sufficient assistance. If that be the case, would it not be better for the reputable plumbers to do what they can to secure the appropriation of funds so that it would be possible to employ an additional force of inspectors? To assail in the public prints the efficiency and ability of the authorities is hardly the way to secure for them the additional funds that it is evident are needed.

In conclusion, we would distinctly state that we do not intend by anything we have said to uphold the health authorities in the violation of ordinary courtesies in their dealings with the Association, if such has occurred, and in any event we trust the authorities and the reputable plumbers will try to work together, and not weaken the position of both sides by indulging in public controversies over details that can and should be settled among themselves.]

ARCHITECTS' SPECIFICATIONS.

NEW YORK, *March* 1, 1883.

To the Editor of THE SANITARY ENGINEER:

There are two points in regard to the proper filling out of architects' specifications which I should like to ask your opinion about. As you are well aware, most architects are not as careful as they should be in drawing such specifications, and to tell the truth, few of them have the practical knowledge to qualify them for this work. In consequence, they usually are compelled to revamp some old specification for another building, or to ask a plumber to draw it up for them. Everyone is familiar with the loose kind of language which is used in such documents, and it is not an easy thing to know whether to follow the specification literally or to use one's judgment in carrying it out. For instance, I lately had occasion to do a job of work in which the specification simply mentioned waste pipe for basins and urinals of a given size, 1¼-inch, without saying anything about the weight of the pipe. The plumber, therefore, put in light weight pipe, and when the fact was discovered after the building was completed, he claimed that he was not bound to put in the heaviest material unless it was distinctly specified. In another case, a number of bids were received for the plumbing of a large building. The specification mentioned only drain pipe of ordinary weight, and some of the bids were based upon this reading, while others estimated upon extra heavy pipe. The architect intended to call for the latter material. The difference in cost between the light and heavy pipe made quite an item in the estimate, and it was said that if allowance had been made for this the work would have had to be awarded to another than the man who really received it. This is a subject worth commenting upon in your columns. W.

[It is a very common complaint on the part of conscientious plumbers who are called on to estimate on indefinite specifications that they know what is expected and what should be done, and having a regard for their reputation, and a desire not to disappoint the owner, they estimate accordingly, and, as a matter of course, are underbid by men who are sharper, and who propose to demand extras, or else do nothing beyond what is actually specified. Under the circumstances, when work is let out in competition, the contractor cannot be expected to do more than the specification calls for. It is such omissions that result in poor jobs, or bills for extras, and there is a certain class of men who prefer to bid on just such apologies for specifications, taking their chances on the extras.]

MONTREAL, *Feb.* 4, 1883.

To the Editor of THE SANITARY ENGINEER:

In connection with the range explosion in a photographer's residence in this city, which is noticed in your last issue, there has been published the statement of a furnace builder that "the man who places a hot water back in a stove should be indicted for murder. If they put in a pipe, there will be no danger, for it will only rip;" and in connection with this the City Boiler Inspector, in his last annual report, recommended that people using hot water or air pipes should be compelled to put a safety valve on them. As several water backs have already exploded, as noticed in the papers, it is a matter of some practical importance to know whether the substitution of a pipe in place of a water back would lessen the liability of explosion, and whether any valve has been designed for use on water backs or their connections for such an emergency as that cited. Will you give your opinion, and oblige, A READER.

[It is possible that a wrought iron pipe might split and not fly into fragments after the manner of cast iron though we think where the superficial heating surface is the same, the results would not vary much. Short pieces of wrought iron pipe are often used, but they soon burn out, and do not heat water as rapidly as is sometimes needed. We know of no valve that can be depended on, indeed, nothing will take the place of care. We again refer you to suggestions on page 277, issue of March 2, 1882.]

PHILADELPHIA, PA., *Feb.* 12, 1883

To the Editor of THE SANITARY ENGINEER:

Enclosed find plan of a job I did last month. They cannot get any hot water. I have had the boiler down and found the tube all right and all the connections clean, but it does not make any hot water, and I am at sea as to what is the matter. I contend that it is the water-back and the way it is constructed, as the back sets in a cylinder cast for the range, and the heat goes over the back instead of striking it. There is no noise about the boiler, for it is a plain job and no traps. The range is an Excelsior hot air range. By giving your opinion you will greatly oblige C.

[From your description we should imagine that the water-back was placed too low to get the benefit of the heat of the fire.]

DR. HOWARD CROSBY'S LECTURE BEFORE THE MASTER PLUMBERS.

A large and interested audience was present last Thursday evening in Steinway Hall to listen to the lecture of the Rev. Dr. Howard Crosby before the Master Plumbers' Association of this city. His subject was the "Glory and Shame of New York." After describing the distinguishing characteristics of the city and its population—the large foreign element, with the remarkable assimilation and harmony of these with the natives, and the energy and common sense of the citizens—the speaker enumerated some of the things of which New Yorkers might be justly proud. The chief glory of the city was her public school system, which had not its equal anywhere in the world, he said: A comparison of the condition of the city forty years ago with that of to-day showed the most rapid improvement ever made in any city. Our great engineering works, as the Croton aqueduct, East River bridge and the elevated railroads were achievements in which we might well take pride.

The glory, was, however in danger of being overshadowed by the shame. This was of two kinds, political and social; but both were largely due to the same causes—"rum and the power of the rumseller." Men were elected aldermen, or to important offices in the city government, not because of any fitness for the place, but because they kept liquor saloons. Grog-shop influence was dominant in the city politics, and the government was practically managed by dirty, vulgar men, whom respectable people would not allow in their houses, There were 12,000 liquor saloons in the city, or nearly one for every 100 persons. Leaving out women and children, there was one for every 33 men, or one for every 18 drinkers. This makes clear the reason for the poverty, and misery of the poor: the patrons of the saloons support the liquor seller instead of their own families, and most of the poverty is the result of drinking.

This was the concluding lecture of the course. We congratulate the association on so interesting and successful a series of entertainments.

THE CHICAGO MASTER PLUMBERS.

At the meeting of the Master Plumbers' Association of Chicago, March 1, the following committee on further conference with the New York Master Plumbers' Association on the subject of coöperation, was appointed: Andrew Young, Chairman, and Messrs. Baggott, Boyd, Hamblin, Harvey, Livingston, Macey, Moylan, O'Malley, Roche, Sanders, Simms, Wade, Whiteford.

The following card to the public was approved:

"The Sanitary Committee of the Master Plumbers Association would recommend to those of our citizens whose cellars or basements were overflowed during the late thaws, a liberal use of disinfectants. A solution of copperas sprinkled over cellars and thorough airing of the same will be time and money wisely expended. A flooding of your cellars means a poisoning of the earth. Particular attention should be paid to the condition of air ducts and furnaces, and the connections of sewers examined and put in order."

The Sanitary Committee consists of Messrs. A. Young, M. Moylan, J. P. Hamblin, Robert Griffith, W. Gay, T. C. Boyd, P. Harvey, Geo. Alles, D. Whiteford, William Boyden.

PLUMBING LAW VIOLATIONS.

No very serious cases of violation of the plumbing regulations in this city were reported last week. Minor violations were reported as follows: By Inspector Eagleson, two, and by Inspectors Golden and Hooper, three each,

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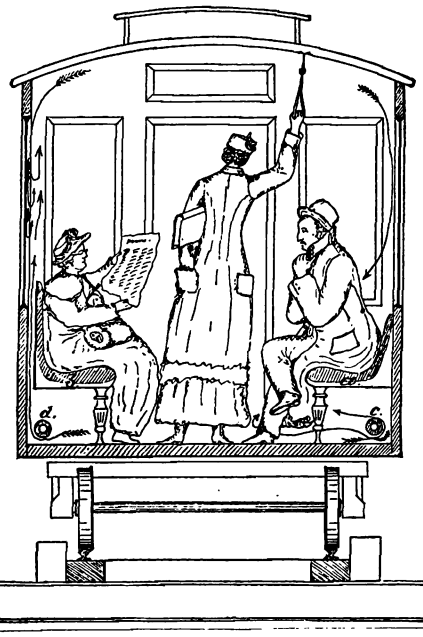
HEATING RAILWAY CARS.

To the Editor of THE SANITARY ENGINEER :

I take the liberty to ask you if the enclosed sketch is a fair representation of the inside of a New York elevated railroad car in winter time—at least in some of its characteristics—a noticeable one of which is the male passengers' gallantry. But the subject most dear to me and to the public, and the one to which I wish to call your attention is neither one of manners nor ethics, but one pertaining to *health* and the business of every one—I mean *warming*.

The cause of ill health is not so apparent in the picture, as the young woman having to stand is certainly in a better position to resist cold and to promote circulation, for she has not the cold air which is continually, and without intermission, falling from off the glass of the windows striking her in the back and shoulders in its downward course. Of course the cold air from the door still strikes her when it is opened, but as the exertion necessary to hang to the straps, as well as support herself otherwise, will maintain a tolerably brisk circulation of the blood, she is better off than he, who is too selfish to give her his seat But why should any one be exposed to the increased danger of catching cold, whether they are supplied with a seat or not ?

The currents of air within a car or room are always *down* where the cooling surfaces are, and that is why a man



with his desk in front of a window may have cold feet, though he is burned on the other side by the direct radiation from a red stove.

In the case of the car the whole outside and roof is cooling surface, and the current of air must pass down and over the seat to escape the floor or the centre of the car, near the floor, where it will ascend again to take the place of that which has fallen.

The greater the difference of temperature between the ascending and descending currents the more rapid the circulation will be, the rapidity aggravating the trouble by taking away more heat in the same time from the back of the unfortunate who may have to occupy the seat.

The fact of a warm current going up seems to surprise no one, and should a person place the hand over a radiator and find no warm air ascending, they would take it for granted it was not warm—that it was *cold*. But why do they not feel the cold air descending from the surface of the glass and draw the conclusion, it was *not hot?*

The fact is, the windows of a building or of anything else are its *coolers* and the radiators are its *heaters;* when the heating effects of the radiators preponderate the chamber is hot, and when the cooling effect of the windows is greatest the room is cold ; a mean in harmony with the surroundings is what is required.

If the volume of ascending warm air is the greatest and it is directly under the descending cold air, the result will be to neutralize it, and to reverse it if the heat is great enough.

This is as it should be; but if, instead, we place the heaters in such positions that the warm current has to pass up in a position remote from the cold one, how can the latter be prevented from falling?

In the car the passenger sitting forms the neutral line, the the cold current passing down behind and about him, and the warm one, or I should say the air (not very warm) forced up in front of him.

Even were the car warmed to be uncomfortably hot, so long as the air is allowed to fall in front of windows, if the air which comes in contact with the glass will be too cold to sit in, what is required in cars and what will prevent this state of things, is to send the warmed air up against the glass forcing a return current in the centre or at some other place.

The argument may be made, that the current falling in the centre is as bad as falling at the glass. But this is not so ; for if it does not come down in contact with the glass it will not be cold, though it may be slightly colder than the air current which takes its place.

The way to look at this, is prevent circulation and you will prevent a loss of heat unnecessarily; all coverings and non-conductors exemplify this.

The air cells are small and numerous, and the rotation of the air within them is slow according to their size, the friction being greater for small cells, and the ratio of loss of heat being in some inverse ratio to the layers of cells.

For this reason double glass saves much heat and materially changes the effect produced by the falling current. A curtain also of some loose and soft material will modify the effect of the glass varying from one-quarter to seven-eighths of all the effect according to the material used ; instance, the curtain in a sleeping car.

I now offer the suggestion as a remedy that the seats of railway cars (when they are parallel with the sides of the car) be moved two inches from the side of the car, as shown at *b* left side, so that the warmed air from the heater can pass up and counteract the cold current from the glass, when steam is in the pipes and when steam is not in them, that the cold air can fall behind the seat, and not over it.

The space under the seats of these cars where the heater usually is should be inclosed with numerous small openings near the the floor ; to admit sufficient air to the heater to supply the upward current and no more, and not as now all open, allowing every atom of heated air to be swept from the car every time the doors are opened, cooling everything, even the heater which is chilled in a manner many times greater than would be necessary to warm the car if the heat was properly supplied.

There is no patent on this nor on the arrangment as applied to cars.

Hoping this may prove interesting to the middle-aged and old, as it is they who suffer the most from cold currents, I am, very resp't yours,

THERMUS.

FEVER-PROOF COSTUMES.

There has been exhibited at the rooms of the National Health Society a novel dress intended for the protection of sanitary visitors, nurses and others who have to enter the rooms of persons suffering from infectious diseases. The garment is of mackintosh, glazed inside and out, and made completely to envelop the wearer and with a hood to cover the head. Thus only the hands and face remain exposed—a matter considered of comparatively little importance, as these can be easily washed with disinfectants. A not less important object proposed to be effected by the use of this dress is, that by its removal when the wearer leaves the sick room, the clothes which have been protected need not be changed, and the danger of the disease being carried from house to house, or communicated to susceptible persons in public vehicles, is obviated. A tight case for the fever-dress to be enclosed in is part of the invention. At the end of the day, or as often as may be convenient, the dress can be cleansed with disinfectants. Further protection is given by a simple form of respirator. This is made of two folds of thin washing net, between which is placed a layer of medicated cotton-wool, through which the wearer can breath, though no germs can pass. The respiratory has tape strings which tie round the ears. After use, the wool is burned and the net washed.—*London Times.*

There is here and there a saint among the many sinners. When the Legislative Prison Committee of Massachusetts were recently inspecting the Concord prison they found that a part of the sewage ran into the Assabet river. To the inquiry of one of the party whether the people of Concord did not object to this pollution of the river, the reply was, "Sam Hoar has an objection, that's all." So at least one clean man remains in the classic Concord.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
March 3.....	24.09	18.86	21.37	27.96	29.94	19.03

E. G. LOVE, Ph.D., *Gas Examiner.*

ELECTRIC LIGHT NOTES.

The Sperry Electric Light, Motor and Car-Brake Company is establishing large works in Chicago.

The Edison Light Company of Milwaukee has been incorporated, with a capital stock of $200,000.

The Bernstein Electric Light Company of Eastern New Hampshire, was organized at Farmington, Saturday, with a capital of $100,000.

The Thomson-Houston system of electric lights is being introduced into Utica, fifty-four lights having been subscribed for by merchants.

The New York State Senate has passed to its third reading the bill compelling all telegraph, telephone and electric light wires to be put underground.

The City Council of Dayton, O., adopted, Feb. 23. a resolution accepting the proposition of the Fuller Electric Light Co. to light the city for one year.

The streets of Seabright, N. J., and the ocean boulevard are hereafter to be lighted by electricity at the expense of the wealthy cottagers and hotel people.

The Arnoux Electric Light Company has received an order to furnish light for the United States and Canadian departments at the Fisheries Exhibition to be held in London.

The telephones in the fire engine houses in Newark were burnt out Sunday night, by contact of the Fire Department wire with an electric light wire. The woodwork in the office of the Superintendent of Fire alarms was set fire to.

A recent conference was held in Boston between many prominent men of that city and the officers of the Edison Electric Light Company of this city, to consider the project of establishing an Edison plant in Boston like that in operation here.

The Edison Company have received permission from the Commissioners of Sewers to continue the lighting of Holborn viaduct by their system for one year, from the 24th ult. The Edison light is to be placed in the corridors and passages of the House of Commons.

All the wires of the Mutual Union Telegraph Company, in Chicago, were cut by order of the Mayor, March 2, because the provision of the franchise which required the company to put its wires under ground by March 1 had not been complied with. The wires of the Board of Trade Telegraph Company were also cut.

Certificates of incorporation of the following companies have been filed with the Secretary of New York State: The Electrical Accumulator Company, to manufacture and deal in all kinds of electrical apparatus, capital stock $50 000; the Overland Telephone Company, capital $1,000,000, with power to be increased to $10,000,000; and the Sun-light Company, for lighting by electricity and transmission of electric power, capital stock $5,000,000.

Meter-ites.

The gas-works of the Town of Lake, Ill. (a suburb of Chicago) were burnt Feb. 24. Loss about $30,000. Insurance $10,000.

Articles of incorporation have been filed for the Perry (N. Y.) Oil and Gas Company, with a capital of $40,000. The object of the company is to bore for oil and gas, also for salt, if it can be found.

An "Associated Press" dispatch from Eastport, Me., states that a gas explosion was caused there by an attempt to thaw the ground by a fire in order to reach a leaking gas main. Twenty feet of the street was torn up, and the corner of a gas reservoir near by torn off.

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Food and Drugs.

ADULTERATION OF TEAS.

An "old tea dealer," writing to the *American Grocer*, condemns most emphatically the sale of adulterated teas in this country. The recent action of Congress in regard to our tea supply has made most readers familiar with the fact that this country is a sort of "catch-all" for the larger part of the inferior and adulterated teas which are excluded from other markets.

The adulteration of tea with foreign leaves, exhausted tea leaves, mineral matter, etc., are frauds which no honest person would attempt to defend. Unfortunately, the coloring or "facing" of the leaves is a practice not so generally condemned as it should be, although it must be clear to all that the real intention of the practice is fraudulent, namely, to make the tea appear better than it really is. The coloring of tea is not confined to China and Japan, but is carried on in this country also. If a green tea should be imported in its natural condition the chances are all in favor of its being colored here before it reaches the consumer.

The writer in the *Grocer* raises the question as to "what tea is to be the future drink of the people of this country." He says: "Their preference for greens and oolongs is most pronounced, but is not this because they have not had the choice of acquiring a taste for either congous or dudion teas? There is less chance of adulteration in these, or, if they were adulterated, it would be more easily discernible than in the case of either greens, capers, pekoes, or oolongs, and for this reason it is a pity that they are not brought into greater consumption. They are more wholesome and economical than the others, and when once the flavor is acquired, much more pleasant to the palate."

BROOKLYN WELLS.

Health Commissioner Raymond of Brooklyn continues to wage war against the public wells in the streets of that city. We are pleased to note that he has the support of Mayor Low in this effort, if not that of the Common Council. The latter body recently passed a resolution directing the "repair" of a pump, the water from which had been shown by analysis to be unfit for drinking. This the Mayor returned without his approval, at the same time calling the attention of the Council to the long list of pumps condemned by the Health Department, and now awaiting their action, saying: "It seems to me to be a very grave and serious responsibility to maintain in the midst of our community wells the water of which is certified to be a source of disease."

The following is one of the most recent reports of Dr. Bartley, chemist to the Health Department. The wells are the worst yet examined.

BOARD OF HEALTH,
BROOKLYN *Feb.* 24, 1883.

DR. J. H. RAYMOND, *Commissioner:*

I have, at your request, made an examination of the water from the following wells; viz.: One situated on Maujer street between Waterbury and Morgan streets, and one situated at the corner of Tenth and South Third streets, E. D.

Both of these should be classed as dirty water; both being turbid, and containing very marked evidences of organic pollution The first one mentioned was exceedingly foul and offensive, and contained so much free and albuminoid ammonia that it was difficult to estimate them accurately by the usual process. The nitrites were abundant; and the chlorine was 7. grains per gallon. This well was visited on two occasions about a week apart and the water was found to be very putrid in both instances.

That this well is contaminated by sewage seems beyond a doubt. The large amount of chlorine present in the water points to sewage or animal refuse.

The average amount of chlorine in London sewage according to the Rivers Pollution Commission is eight grains per gallon; and the minimum anount is 4.55 grains per gallon. As will be seen, the chlorine in the water, which is largely of animal origin, is nearly as great as that in average London sewage. This is the worst water yet examined. No one could think of using the water in its present condition, any more than they could use sewage.

The second one mentioned, gave the following results: Free ammonia, 18 per million, and albuminoid ammonia, 20 parts per million. The chlorine in this one was low as compared with the well waters throughout the city, being only 2.2 grains per gallon. Nitrites were present in considerable quantities. The large amount of ammonia, both free and albuminoid, places this among the class of bad waters, and condemns it above all question.

Very respectfully, E. H. BARTLEY.

SEVERAL HEALTH BOARD REPORTS.

FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF KENTUCKY 1882. XLIV. 109 pp., 8vo.

We had heard nothing from, or of, the State Board of Health of Kentucky for a year or more, until this report came to hand, hence we opened it with no little curiosity and laid it down with a corresponding disappointment. Whatever the board may have been doing there is no record in this report of anything that it has accomplished, or that it desires to accomplish.

Its 109 pages are devoted to what is called a registration report, the statistics of which, as Dr. J. W. Holland, a member of the board, remarks, are of no value and any deductions from them would most likely be misleading. Dr. Holland's paper on the registration of vital statistics points out briefly and clearly that the physician is a necessary part of the machinery for obtaining vital statistics and that, therefore, the State should require "that the licensed doctor shall have enough technical knowledge to establish the presumption that his opinion of the cause of death will be so near the truth as to be available for practical purposes." Some amusing illustrations of ignorance, as shown by reports of causes of death, are given—such as "falling of the brain;" and "delicacy."

The total expenses of the board were $2,292.08 and it had a balance at the end of the year of $1,007.98 as against a balance the year prveious of $460.28; but while this economy is in one sense praiseworthy, it shows that there was very little desire on the part of the Board to do anything.

The Louisville *Medical News* in a recent editorial upon this board, apparently written by some one who knew what he was talking about, says "two members of the board never attend its sessions and take no interest whatever in its work * * * It is the perpetual cry that nothing can be done unless a larger appropriation is made for the work of the board. Every physician knows the present appropriation is altogether too meager for the work assigned an efficient State Board of Health. For the work of the Board as now conducted, however, the appropriation is ample, and more than ample. There is nothing practical in the little work which is now conducted Public confidence and professional coöperation are most needed by the board. After this will come increased appropriation; but when so little is given in return for the annual expenditure of public money as now obtains, it is useless to expect further aid. Indeed, if the existing condition of affairs is continued, we doubt if the next General Assembly will make any provision whatever for the preservation of the public health."

There may be some personal difficulties in connection with some member of the board which we know nothing about, but at all events, so far as we can gather from this report, the strictures of the editor are justified.

This board has been in existance four years, and by this time ought to have some definite plans and to be able to furnish some definite information. It is to be hoped that it will soon give both to the public.

THIRTY-SEVENTH ANNUAL REPORT OF THE BOARD OF SUPERVISION FOR THE RELIEF OF THE POOR, AND OF PUBLIC HEALTH IN SCOTLAND. 1881-82: Edinburgh, 1882: XXVII, 338 pp. 8 vo.

The greater part of this blue-book relates, as usual, to the work of the Board under the Poor Law, but there are some items relating to public health matters which are of interest. Since 1875 the Board has received from local authorities 180 applications of its approval of loans for raising funds for sanitary purposes. The aggregate amount of these proposed loans is £1,101,745, 11*s.* 11*d.* The total amount of loans recommended by the Board has been £1,049,088, of which £741,341 were for the execution of water works, £139,877 for sewage and drainage works, and £115,450 for the erection of hospitals. This system of requiring a central authority in case a local authority desires to borrow money to construct water works, sewerage, etc., seems to work well, as it ensures the careful preparation of plans and estimates for such works, and that these are subjected to the criticism of competent engineers before the required permission is granted.

The total expenditures of local authorities during the year for sanitary purposes, amounted to £287,992, 15*s.* 8*d.* but this does not include operations carried on under the General or Local Police Acts. The greater part of the space in the appendix which relates to public health, is taken up by reports upon the Notification of Infectious Diseases by the Medical Officers of Health of Edinburgh and Greenock—Drs. Littlejohn and Wallace, these places having been selected for reports, because in the former, the duty of notifying to the local authority cases of infectious disease, is laid by the law on the medical attendant of the patient, whereas, in the latter, the duty rests on the householder. The reports are too long to quote and cannot conveniently be summarized, but both Dr. Littlejohn and Dr. Wallace are strongly of the opinion that the duty of notification should be made compulsory on the physician. Dr. Wallace reports that good results have been obtained by the law exacting reports from householders, but not so good as could be had by the other plan. Both of them agree that to obtain success, it is necessary that the medical officer of health should not be a practising physician. Dr. Littlejohn claims that the system has been put to a crucial test in Edinburgh, and has been a great success, and that "the medical men of the city now unanimously approve of it." This statement is certainly erroneous, for we know that some of the medical men strongly disapprove of it, and this dissatisfaction has been increased by some recent prosecutions in that city—but the argument of Dr. Littlejohn is, nevertheless, a very strong one, and, as such, we commend it to those who are interested in this subject.

The annual reports of the Registrar of Vital Statistics, Board of Health, and City Physician, of Concord, N. H., for the year 1882, are contained in a pamphlet of 14 pages, which we have received. We learn from this that the number of deaths in Concord during the year was 216, being less than for the preceding year, when they were 240, and giving for the estimated population of 14,000 a death rate of 15.44 per thousand. This is certainly low, but the system of registration is based on burial permits and seems satisfactory; in fact, the Board say, "we believe no other city in New England can show equally accurate tables of vital statistics." 38 of the deaths, or about 16.6 per cent. of the whole, were caused by consumption, eight by typhoid fever, and 19 by other zymotic diseases. The number of births for the year was 272.

The report of the City Physician, Dr. George Cook, is very brief, but he makes the remarkable statement that "I am safe in saying that there is a population of 12,000 in that part of the city that would come to me in case medical assistance was furnished by the city." If 85 per cent. of the inhabitants of Concord would take gratuitous attendance from the City Physician if they could get it, they must be either very poor or astonishingly harmonious in their views as to the merits of the physician himself. No definite information is given as to the sewers, it is simply said that there is a very complete and well-ordered system.

No financial statement is furnished, an omission which should never be made in reports of this kind. The Board practically does nothing except upon complaint; it has no inspector, and very possibly has no finances to report about, but if this is so, the fact should be stated.

As regards water supply, the Board say, "we have as pure a supply as any city in New England." They then say that the preservation of the purity of this supply requires care, but they give no hint that it is being made impure, and make no recommendations But when we refer to the report of the State Board of Health we find that the water supply of Concord is from a small lake which is already seriously polluted by garbage, etc, and will be still more so. It seems to us that the Board of Health of Concord should have something to say in this matter.

BOOKS RECEIVED.

FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH, LUNACY AND CHARITY, OF MASSACHUSETTS.

FOREST PROTECTION AND THE TARRIFF ON LUMBER. New York, 1883.

ELEVENTH REPORT OF THE BOARD OF TRUSTEES OF THE ILLINOIS INDUSTRIAL UNIVERSITY, for the two years ending Sept. 30, 1882.

A member of the Philadelphia Board of Health, wants the office of the board put in communication with the general telephone system, and kept open for answers until four P. M.

The *Thonindustrie Zeitung* says that the cement and concrete in the sewers at Frankfort and Hamburg are as good as when laid down four years ago, and become harder by age.

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PHILADELPHIA SEWERAGE.

The Committee of Physicians and Citizens of the general Committee of Twenty-one, interested in the sanitary condition of the city, met this afternoon at the rooms of the Committee of One Hundred. The recommendation of the plumbing part of the Committee of Twenty-One, that every man be required to connect his house with the street sewer, was discussed, but the Committee voted that it deemed it inexpedient at the present time, owing to the bad system of sewerage now in vogue, and the great expense that would be attached in such an undertaking, to compel citizens to make said connections. The committee suggested that a sanitary engineer be employed by the city, whose sole duties would be to effect a better condition of sewerage, and see that it was kept in proper order at all times.—*Philadelphia Chronicle Herald, Feb.* 15.

Philadelphia is indeed badly off. Their cesspools are vile and should be abandoned, yet it seems that many of the public sewers are cesspools on a large scale. On this account we presume the committee of physicians and citizens advise against a change that would entail some expense, and, as they believe under the circumstances, secure no adequate advantage, we are of the opinion that where the sewers are in reasonably good condition house owners should be compelled to connect with them, and clean out and fill up their cesspools. Such other sections of sewers as require it should at once be put in proper order under the direction of a competent engineer backed by an influential committee, and as rapidly as this is done householders, should be compelled to drain into them.

YONKERS SEWERAGE.

The Report of the New York State Board of Health relating to the nuisance created by the foul condition of the Nepperhan river at Yonkers, which was submitted to Governor Cornell on September 8, 1882, but has not been acted upon, either by him or by Governor Cleveland, has been transmitted to the Yonkers Board of Health. The report is clearly and concisely condemnatory of the horrible state of affairs they found to exist, and which is fully explained in the report of the engineer, Mr. J. J. R. Croes C.E., who was engaged by the Board to assist them in their examinations, and whose recommendations as to the best mode of abatement of the nuisance are endorsed emphatically by the Board.

The Yonkers Board of Health has transmitted these reports to the common council with the extraordinary recommendation that the question of how the nuisance shall be abated be submitted to popular vote at the coming charter election.

The reason which is assigned by the local board for this shirking of responsibility savors strongly of demagogism. It is thus formulated:

"WHEREAS, There is a difference of opinion as to the best means of abating the nuisance; and

"WHEREAS, This board recognizes and respects the voice and choice of the people in deciding for themselves as to which of the two plans submitted for the abatement of the Nepperhan river nuisance they will adopt; therefore be it

"*Resolved*, That the Honorable the Mayor and the Common Council be requested to take such steps as may seem necessary to give the voters of this city an opportunity to express their wishes, through the ballot box, at the approaching spring election, as to the best mode of abating this great nuisance."

The "two plans" referred to are, first, the arching over of the river for its whole length through the city, and making it a vast sewer; and second, the conveyance of sewage by lateral sewers in the adjacent streets and leaving the stream open and unpolluted. The latter plan is the one recommended by the State Board, by the Water Commissioners and by every engineer who has examined the subject. The first plan has been condemned by every expert who has been called on to report on the subject. Its chief advocate is the Health Officer of the city, who ignores the scientific, the sanitary, and the economic objections to the scheme, and takes his stand merely on his opinion unsupported by argument or fact, that the stream out to be made the sewer. The Mayor of the city, who is also a practicing physician, and surgeon to the police board, has in this case joined with him in advocating the submission of a question of engineering to a popular vote.

It may fairly be asked if these gentlemen would think it judicious to call on the voters of Yonkers to decide by ballot whether vaccination was advisable in case of an epidemic of small-pox, or whether the cure of diseases in the city should be confined to the homœopathic or allopathic physicians, or how certain law suits against the city should be defended.

None of these are questions to be settled by the *vox populi*, and the suggestion of an appeal to that tribunal in this instance, seems to indicate that what was intimated by one of the gentlemen who appeared before the State Board in August, must be true, namely, that some local political questions enter into the matter, and that certain officers of the city are afraid to do their duty, and want to shift the responsibility of their dereliction to the shoulders of the people.

The reasons why the Health Officer's plan should not be adopted, are plainly given in Mr. Croes' report, and they have never been controverted.

The Yonkers Common Council on receipt of the reports and recommendations of the local Health Board, referred the matter to a committee, opinion being apparently divided in the Council, the members who were not afraid of assuming responsibility taking the ground that there was neither authority nor reason in attempting to shift their responsibility to the shoulders of anonymous voters, who would not be so well informed as the Council, and who might not have any direct interest in the proper solution of the problem. It is a good sign that the two newspapers of the city take the same ground, and condemn the shuffling policy of taking a popular vote.

Construction Notes.

WAKEFIELD, MASS.—The Quannapowitt Water Company has awarded the contract for furnishing and laying cement-lined iron pipes for street mains to Messrs. Goodhue & Birnie of Springfield. The pipes will be laid in the spring.

PHILADELPHIA.—The report of the Board of Experts appointed to consider the best means of securing an adequate water supply for Philadelphia was presented at a recent special meeting of the joint committees of finance and water of the City Councils. The experts, consisting of Messrs. E. V. Chesebrough, J. Vaughan Merrick and Frederick Graff, reported the following named machinery and appliances as being, in their opinion, imperatively needed for a supply during the coming summer. At the Schuylkill works—two fifteen million gallon engines, two forcing mains, boiler and engine house, etc., and the completion of the 48-inch main partly laid; total cost, $250,000. At the Roxborough Works—one seven and a half million gallon engine, etc., cost $60,000. Distributing main to supply Germantown from Mount Airy reservoir to Manheim street, on Green street, cost, $70,000, and at Frankford works a ten million gallon engine and connections, to cost $45,000. They further recommend the early completion of the East Park reservoir entire, with connecting, forcing and distributing mains, the building of a reservoir at Cambria and Thirtieth streets, and an addition to the works at Mount Airy. The total cost of the work estimated at $2,267,200, of which amount they recommend the expenditure of $372,500 for finishing the small basin and work on others at the East Park reservior, $200,000 for purchase of land and work on the Cambria street reservoir, and $75,000 for cost of land and work at Mount Airy. The total amount recommended to be expended this year is $1,072,500, while the total amount at the disposal of Councils from any source for the purpose is only about $500,000.

NEW YORK CITY.—The following lowest bids were opened at the headquarters of the Fire Department on the 28th ult.:

For four steam fire engines, the Clapp & Jones Manufacturing Co., $15,200.

For four engines of another pattern, the Ahrens Manufacturing Co., $15,900.

For 15,000 feet of 2½-inch seamless patent improved carbolized steam fire engine rubber-lined hose, made of best Gulf cotton and best Para rubber in lengths of 50 feet, with standard couplings attached, Gutta Percha Manufacturing Co, $15,750.

For eight 4-wheel hose tenders, John N. Bouschelle, $6,565.

Lynn, Mass., is discussing the question of an additional water supply. Mr. Rowell, of the Water Board, favors the construction of a series of filtering galleries along the bank of the Saugus River. Immediate action is said to be necessary as the pond supply is lower than ever before.

A bill has been introduced in the New York State Legislature authorizing the Highland trans-Hudson railroad to construct a bridge across the Hudson River between Storm King and Break Neck Mountains, at any point within five miles north of said mountains, to be built at least fourteen feet above high water. The pier shall be placed 500 feet from each other. The State Engineer shall fix the place of the construction of the proposed bridge.

The Amsterdam (N. Y.) water works are to be completed, at a total bonded cost to the village of $257,000.

Certificate of incorporation of the Carthage Company for supplying water, for mining, domestic and manufacturing purposes, the acquisition and development of lands and water, manufacture of lumber, wood pulp, etc., has been filed at Albany. Capital $100,000.

Bids for Dredging on the Middle Neebish, St. Mary's River, Michigan, received by Maj. F. U. Farquhar, Corps of Engineers, U. S. A., on February 28, 1883, in accordance with advertisement dated January 30, 1883.

NAMES OF BIDDERS.	UPPER SECTION.		MIDDLE SECTION.		LOWER SECTION.	
	Bank Measure Per cub. yd.	Scow Measure Per cub. yd.	Bank Measure Per cub. yd.	Scow Measure Per cub. yd.	Bank Measure Per cub. yd.	Scow Measure Per cub. yd.
	Approximate Quantity, 100,000 c. yds.	Approximate Quantity, 125,000 c. yds.	Approximate Quantity, 100,000 c. yds.	Approximate Quantity, 140,000 c. yds.	Approximate Quantity, 100,000 c. yds.	Approximate Quantity 140,000 c. yds.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
John Hickler, Buffalo, N. Y.	72	62	72	62	72	62
Williams & Upham, L'Ause, Mich	75	68	75	68	75	68
David W. McConnell, Buffalo, N.Y.	79	70	79	70	85	75
Harvey Fox & Co. Chicago, Ill	98	67	90	67	90	67
C. T. Barker, Sault St. Marie, Mich.	95	68	1 25	68	1 25	70
James Rooney, Toledo, Ohio	1 00	65	1 00	65	1 00	68
Carkin, Sickney & Cram, E. Saginaw, Mich.	1 25	72	1 25	72	1 25	65
Chicago Dredging Co., Chicago, Ill.	....	75	....	85	....	72
Norris G. Dodge, Littlefalls, N. Y.	....	66	....	82	....	82
Christian Schwarz, Fort Howard, Wis.	....	83	....	83	....	83
Horatio Truman, Manitowac, Wis	....	70	....	....	....	....
Green's Dredging Co., Chicago, Ill	....	1 65	....	....	....	....
Edward Moore, Portland, Maine	....	....	....	....	....	....

PHILADELPHIA SEWER BIDS.

The Highway Committee opened proposals for constructing the following sewers and awarded their contracts to the lowest bidders: for branch sewer on 18th street from the sewer in Green street northward 106 feet to W. B. M. Conklin, at 1.97 per foot and $25 per man-hole, the highest bidder being W. L. McGlue at $3.45 per foot and $25 per man-hole.

Branch sewer on 47th street from the sewer in Westminster avenue to Wyalusing street, to G. H. Miller, at $2.10 per foot and $25 per man-hole, the highest bidder being W. Armstrong, at $4.20 per foot and $28 per man-hole.

Branch sewer on 11th street, from Somerville street to Somerset street and thence to Warnock street, to Bonner & Haley, at $2.10 per foot and $25 per man-hole, the highest bidder S. Cox, at $3.00 per foot and $25 per man-hole.

Branch sewer on 30th street, Susquehanna avenue to Ridge avenue, and thence to 29th street, to Bonner & Haley, at $2.30 per foot and $21 per man-hole; highest W. Armstrong, at $3.35 per foot and $25 per man-hole.

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Branch sewer on 27th street from Parish street to north line of Cambridge street, to Joseph Murray, at $3.85 per foot and $25 per man-hole; highest, W. L. McGlue, at $4,98 per foot and $25 per man-hole.

GOVERNMENT CONTRACTS.

Post office and sub-treasury extension, Boston, Mass. Synopsis of bids for iron work (screens, stairways, etc.)

	Total of Bid	*Estimate for Illuminating Floor Lights.*
Bartlett & Haywood	$23,250.00	$5,300.00
Chelmsford & Co.	23,354.70	4,515.88
Phœnix Iron Co., Trenton, N. J.	20.600.00	5,867.00
Haugh, Ketcham & Co.	25,674.82	7,217.15
G. W. & F. Smith Iron Co	17,000.00	4,700.00

No award.

Post Office and Court House Philadelphia, Pa. Hardware. Hopkins & Dickenson, $4 339.53; P. & F. Corbin, $5,163.45. No award.

Post Office and Court House at Topeka, Kansas. Iron Furring and Lathing.

	Amt. of Bid.	ADDITIONAL WORK.		
		Furring and Lathing walls and Ceilings, Per sq. foot.	*Furring and Lathing cornices, etc.*	*Plain Lathing for walls.*
Cooper Mfg.	$4,800 00	20 ct.	22 ct.	20 ct.
Haugh, Ketcham & Co	3,297 62	16	19	10
Kinsley Bros. & Miller	4,298 00	23	35	17
Jno. W. Hoyt	3,770 00	25	35	20

No award.

HOW DENVER, COLORADO, GOT HER SEWAGE SYSTEM.

CHICAGO, ILL., *Feb.* 1, 1883.

To the Editor of THE SANITARY ENGINEER:

The following may not be news to you, as you apparently have a faculty for finding what corporations are about, and their motives for what they do, whether or not they feel disposed to give the information you seek, but Denver is far from New York, and the people there are all looking for "*traces of mineral,*" and can see nothing unless it has a shine to it (smells having no value whatever), with a prospect of a monopoly, big or small, whereby they will "make their strike" and sell out, or "stock the mine" and go east. But in that land of "mineral," where even the patient Chinaman can buy a pair of rubber boots and a frying pan and go into the south Fork of the Platte and wash five dollars' worth of gold, when it is not too cold, there was one man who had a monopoly so gigantic that he made even the bonanza kings "squeal." Was it a prior claim on Capital Hill with the vein running through the centre of the city? Was it gold or was it silver? No! it was an odorless excavating machine, and he charged $5 per load for removing the contents of the cesspools and discharging it in the Platte. The cry amongst the hotels and large buildings was, "No monopoly! We must have a sewer! Five dollars a load! Robbery!" "But we would not care," says the leading hotel man, "only we have wash basins in every room and self-closing faucets which these deuced assemblymen and senators don't know how to close, and when one comes in slightly 'under the weather' from the effects of the light atmosphere we have up here, he will ruin five dollars worth at 'a lick'—just what we charge him for the day's board. So you see it behooves us to be economical."

So the leading hotel man goes to all the other hotel men with a petition, asking for a sewer to empty into the Platte to break up this monstrous monopoly. They all sign but *one* and are almost happy, but it takes time, even to build a sewer, not to take into consideration the enormous amount of time it takes to get a measure through the gauntlet of municipal *pros* and *cons*. Now, what do you suppose this ungrateful monopolist did when he found his career so near an end. Why he actually raised the price to $10 per load on the hotel that took the initiative, and lowered it to $2 for the hotel keeper who did not sign.

Thus Denver became a sewered city and a model for the other cities of the plains (*on the railroad maps*), because *the grasping cupidity of one man would not let him take cesspool trash to the river at* $1 *per load.*

Yours, etc., F.

The recent school calamity in this city has induced Building Inspector Esterbrook to issue the following order. A similar record obtained in other cities would be desirable:

"You are hereby directed to report to this office a diagram of the floors, showing the position and size of all doors, windows, stairs and all means of egress, of all school buildings in your respective districts, to enable the Inspector of Buildings to determine what additional means of egress are necessary. You are not to neglect your other duties, but by a wise arrangement of your daily plans you can do a great deal toward preventing a like calamity to that which occurred a few days ago. In short, this duty must be done. You will be required to continue within your respective districts, attending to your respective duties, until six o'clock P.M., on every working day except Saturday, and on that day you are to remain at your posts until four o'clock P.M. On the application of any examiner in whose district there are many schools, examiners from other districts will be assigned to assist in order to equalize the amount of work required to be done by each examiner."

IMPORTATION OF INFERIOR TEAS.

The bill to prevent the importation of inferior teas, which we noticed in our issue of Jan. 18, has passed both houses of Congress.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

46, 48 and 50 W 9th st, br flat; cost $150,000; o, Furniss Estate; a, Ralph S. Townsend; b, R. Townsend....Mangin st, w s 28 s Rivington st, br factory; cost $6,000; o, Franz Baier; a, John Brandt.....301, 303, 305 and 307 E 11th st, r, and 302, 304, 306 and 308 E 12th st, br factory; cost $14,000; o, James Mulry; a, Fred Jenth....522 to 532 W 49th st, br ten; cost; ea $10,000 and $15,500; o, Philip Hauseman; a a, Wm. Rankin....533 W 33d st, br and iron foundry; cost $6,000; o' and b, Moses M. White; a. J. H. Westcott....329 W 43 st, br st ten, cost $14,500; o, Michael Swick; a, C. F. Ridder Jr; b not selected...217 219, 221 and 223 E 43d st, br factory; cost $20,000; o, Jacob Sebastian; a, J. Kastner....227 and 229 W 29th st. br foundry; cost $10,000; o' John J. Bows; a, J. M. Dunn....58th st, s s 250 e 2d av, 3 br ten; cost ea $13,000; o, Morris Steinhart; a, A. B. Ogden....Madison av, n w cor 60th st, 2 br dwel; cost $35;000 and $40,000; o, a and b, Chas. Buek & Co.,....17, 19, 21 and 23 E 72d st. n e cor Madison av, 4 br dwel total $160,000 o, a and b, Robert B, Lynd. ...1302, 1304 4th av, 2 b st ten; cost $50,000; o, Elizabeth Seitz; a, J. M. Dunn; b, Chas. Seitz ....3d av, n e cor 104th st, br store and ten; cost $20,000; o and b Thos Fealey and Michael Riley; a, B. Walther....3d av, e s 20 n 104th st, 3 br st and ten; cost, ea $18,000; o, a and b, same as last....108th st, n s 56 w 3d av, fr st; cost $400; o, D. M. Wehrenberg; a, J. H. Valentine... 124th st, n s 223 or 225 e 3d av, 2 br st ten; cost, ea $55.000; o, Anthony Smyth; a, Cleverdon & Putzel....127th st, n s 300 e 3d av, br ten; cost $16,000; o, F. Goodrich; a and b C. Kays....145th st, n s 125 e 10 av, 4 fr dwel; cost, ea abt $1,500; o, N. Hobart; a, T. M. Clark ....Lexington av, w s 64 s 127th st, br dwel; cost $7,000; o, Richard P. Risdon; a, J. H. Valentine... 125th st, n s 285 e 6th av, br st and ten; cost, $12,000; o, W. P, Birdsall; a, J. H; Valentine; b, W. P; Birdsall....125th st, n s 305.6 e 6th av, 2 br st and ten; cost ea $24,000 o, same as last.

ALTERATIONS, NEW YORK CITY.

18 E 32d st. br exten; cost $12,000; o, W. P. & A. M. Parson.. 150 st n e cor Rivers av, move building and alterations; cost $5,000; o, L. H. Mace and F. S, Groyer; a, E. Sniffen... 20 and 22 Av A, new st fronts, and alterations; cost $7,000; o, Mary W. Folsom by Geo. W. Folsom, committee; a, M. O'Meara; b, not selected... 76 University pl, alterations, extension; cost $12,000; o, Carl H. Schultz; a, Ed. E Raht; b, R. L. Darragh & Co, and Hamilton & Henry....205 e 41st st. add one story, and extension; cost $7,000; o, Francis R. Kidwell; a, J. V. Mettler....48 E 53 st, and 503, 511 Madison av, add one story, also br extension, $——; c, Kate W. Ambrose; a, H. Kafka; b, not selected....144 W 23 st, basement exten, story changed for busi purposes; cost $8,000; o, James A. Ruthven; a, D. & J. Jardine....313, 319 W 59th st, raise building one story; cost $3,000; o, O. L. Jones; a, Thom & Wilson; b, Vix & Son....107 and 109 Av B, br exten; cost $5,000; o. Philip Gamprecht; b, Wm. Graul ...1 W 3d st, br exten and alterations; cost $5,500; o, E. P. Deiker; a, C. E. Hadden....264 and 266, Madison st, alterations; cost 1$3,000; o, Rev. N. J. Hughes; trustee; a, Arthur Gross; b, J. C. Taylor.

BROOKLYN.

145 Ellery st, s s 175 e Marcy av, fr ten; total cost $12,000; o, Fred Miller; a, Engelhardt; b, George Lehrian and J. Rueger....Ainslie st, s s 200 e 9th st, br factory; cost $10,000; o, Henry Schade; a. E. F. Gaylor; b, Jas. Rodwell and R. B. Ferguson ...Marcy av, s w cor Hayward st, br st and dwel; cost $8,000; o, a and b, H. Grasman.... Flushing av, n s 100 e Bogart st, fr ten; cost, each $4,300; o, Hartman & Farling; a, J. Platte; b, J. Schoch ...Graham av, e s 75 n Seigel st, fr st and ten; cost $6,500 o, Henry Hanselmann; a, J. Platte; b, F. J. Berlenbach....Bedford av, e s abt100 n Penn st, br st dwel; cost $10,500; o. John H. Rehse, a and m, Henry Hollwedel; c, L. Antonius... Joralemon st, pier at foot of, fr storage shed; cost $5,700; o, Franklin Woodruff; a and b; Thos. Stone.... Park av, s s 250 e Throop av, 2 fr ten; cost, ea $3,300; o, Webber and Mueller; a, J, Platt; b, U. Maurer and D. Kreuder,

BROOKLYN ALTERATIONS.

Pulaski st, s s 200 w Tompkins av, altered into two buildings; raised stone foundation beneath, exten; cost $4,000; o, H. O. Pearce; b, W. Campbell....60 North 3d st, add one story; cost $2, 600; o, A. Avery; b, M. Smith and Bruetsch & Co.

BALTIMORE, MD.—Fulton, e s, br school house; o, St. Martin's Church.... Bull, n s, four br bldg; o, Jos. Thomas....Sharp, e s, two br bldg; o, Jos. Thomas .. Belair av, e s, br bldg; o, F. C. Fossett....Chesapeak, w s, six br bldg; o, Geo, G. Tyler....Harris Alley, six br bldg; o, Geo. G. Tyler....Getz av, e s, 14 br bldg; o, J. G. Getz; b, J. W. Getz ...Prestman, four br bldg: o, W. L. Stork....Aliceanna, n s, three br bldg; o, Ant. Weiskittel.... Roberts, s s, 13 br bldg; o and b, Wm. Collett....Roberts, w s, 13 br bldg; o and b, Wm. Collett....Bloom, w s, five br bldg; o and b, Wm. Collett....Pacca, e s, seven br bldg; o, D. C. M. J. & J. A. Schult....West, w s, two br bldg; o, same as last Charles, s e cor Banklan, br bldg; o, Est of H. Wave....Burgondy Ally, w s, eight br bldg; o and b, J. H. and J. F. Pfeiter ....Paca, e s, seven br bldg: o and b, same as last....Port Ally, e s, 13 br bldg, same as last....Gilmore, n e cor Baker, six br bldg; o and b, Wm. McCoy & G. W. Shorter....Baker, e s, five br, bldg; o and b, same as last....Tennant, w s, ten br bldg; o and b, A. Mahone....Mount, n e cor Tennant, 13 br bldg; o and b, same as last....Fulton, s e cor Tennant, 14 br bldg; o and b same as last....Mount, s w cor Tennant, 15 br bldg; o and b, same as last....Kirby Lane, e s, three br bldg; o, Wm. S. Isac; b, A. Mahone....Fort av, w s, six br bldg; o, Samuel Burns.

BOSTON, MASS.—515 and 521 Washington st, br mechanical bldg; o Frederick L. Ames; b, M. W. Rumery....81 and 93 Richmond st br mechanical and mfg. build; o, D. Goodnow; b, John Kelly.... Crescent ave, nr Cambridge st, fr storage of gravel; o, Chas. J. Miers; b, Spence....Commercial st, nr Ellesworth st, fr store; o, P. & M. Finnegan; b, M. Ryan....O st, cor E 7th st, fr dwel; o, Emanuel E. George; b, C. A. Flower... 16 Prospect st, fr dwel; o, Charles Robinson, Jr.; b, Geo. M. Starbird....22 Prospect st, fr dwel; o, Chas. Robinson, Jr.; b, Geo. M. Starbird....26 Prospect st, fr dwel; o, Chas. Robinson, Jr.; b, Geo. M. Starbird.... 679 Saratoga st, fr dwel; o, Benj. McKissick; b, Jas. H. Coffin.... Greenwich place, nr Dorchester ave, fr stable; o, John Hogan... Bodwell Park, nr Bird st, fr stable; o, John I. Merrill; b, Alton G. Reed....19 Ellery st, fr storehouse; o, Bartholomew Graham; b, Dennis O'Keefe....Hartford st, w s Howard av, five fr dwel; o and b, A. P. Clifford.. .Hartford st, e s Howard av, five fr dwel; o and b, A. P. Clifford... Lamartine st, fr poultry h; o, Geo. Darby; ...Norfolk st, nr Walk Hill st, fr dwel; o, Edgar Hollings; b, J. Haddock. .Gibson st, nr Dorchester av, fr carriage house; o and b, Darias Eddy....Dale st, nr Sherman st, fr dwel; o and b, Benj. F. Bean....23 Dale st, fr dwel; o and b, Benj. F. Bean.... 25 Mills st, fr dwel; o and b, Benj. F. Bean....27 Mills st, fr dwel; o and b, Benj. F. Bean.

CINCINNATI.—6th st, 643 and 645, repair br house; cost $7,000, o, and b, J. K. Hurm....4th st, 98 and 100, br house; cost $30,000; o, and b, David Sinton....Cor 7th and Elm sts, br house; cost $10,000; o, Queen C. Club; b. J. W. Cotteral & Co....Cor Hackberry and Sycamore, bi house; cost $6,500; o and b, J. H. Overbeck

CHICAGO, ILL.—Ashley st 4 br dwel; cost $7,000; o, C. J. Hull; a Wm. Wilson; b, C. J. Hull....cor Fremont and Genter st, b st and dwel; cost $6,000; o and b, Fred Greisback...1057 N Clark br dwel; cost $6,000; o, L. E. Hickmott; a, Holabird, Simons & Roche; b, Louis Weick..73 Maple st, br flats; cbst $8,000; o, E. B. Washbourne; a, L. G. Halberg; b, Geo. Peterson... Groveland Park Pl, br flats; cost $8,000; o, Jno. Gallagher; a, W. H. Drake; b. Robt. Tobin....443-445 W Randolph st, br st and dwel; cost $9,000; o, A. J. Snell; a, A. Smith; b, owner....310 Webster av, cost $5,000; o, J. Marshall . 589 Sedgwick st, br dwel; cost $5,000; o, P. J. Gillen....137 Wesson st, br flats, cost $5,000; b, Joe Zovier; b, Jno. Wilkosky... cor Division and Ashland av, br st and dwel; cost $6,000; o, Nicholas Felz; a, Wm. Runkle; o, Mr. Frohlich....428 La Salle av, br dwel; cost $6,000; o, W.S. Mellen a, G. Vigeont; b not decided....cor Clybourn av and Halsted st, br store and dwel; cost $9,000; o, F. Friedberg; a, H. Olson; b, not decided....514-518 W. Van Buren st, br flats; cost $5,000; o, Dr. E. F. Ingalls; a, L. G. Halberg; b, not decided....549-551 S Oakland av, br flats; cost $6,000; o, Martin Ruettner; a, Wm. Stripple; b, M. Ruettner... 716 W. Van Buren st, st and flats; cost $6,500; o, F. Parker; a, W. A. Furber; b, H. Copeland... 451-453 W. Jackson st, br add making flats; cost $6,000; o, Henry White; a, J. P. Jones; b, J. P. Jones....La Salle av nr Oak, 3 h br and terra cotta; cost $30,000; o, Mr. Kirkwood; a, Burling & Whitehouse; b, not decided....Milwaukee av nr Fulton, br warehouse; cost $55,000; o, not given; a, Burling & Whitehouse; b, not decided....Modron st e of Bridge, store br and terra cotta; cost $40,000; o, M. Swartz; a, Burling & Whitehouse; b, not decided; cor Michigan av and 32d st, Lake Superior good stone house; cost $50,000; o, C. T. Gerkes; a, Burling & Whitehouse; b, not decided.

KANSAS CITY.—Primrose Hill, fr dwel; cost $1,500; o, G. M. Shelly; a, J. Bannon....Walnut st, br dwel; cost $4,000.....5 & 6 Wyoming st, br. dwell; cost $6,000; o, C. E. Emery....E. 18th st, fr dwell; cost $300; o, D. S. Long.

PHILADELPHIA.—Moore, w of Deleware av, fac'y; o, Baugh Sons.... Johnston, w of 20th st, storehouse; b, John Doyle....Alder, No. 1,228, dwel; o, Thos. E. Day....5th, n of Huntington, two stores; b, E. E. Sheppard....Cherry, w of 21st st, dwel; b, W. J. Gifford ....Phillip, n of Norris,, four dwel; b, A. T. Richards ...Elm No. 3,626, dwel; b, S. Bowers....Ringold, s of Parish st, five dwels; b, F. Black....Second, No. 5 N, store; b, W. J. Wilkins ....Conniscence, No. 623, addition to factory; b, Richards & Shrouds....North 7th, No. 869, dwel; o, J. V. Smith....24th, n of Montgomery av, 34 dwels, two with stores; b, H. R. Shoch.... Arch, No. 522, storehouse; b, J. A. Riter & Co....Hamilton, e of 35th st; six dwels; b, John Shedwick... Story, e of 34th st, seven dwels; b, W. J. Shedwick & Sons....Pepper, above Memphis st, four dwels; o, Thos. L. Kelly....Lanson, w of 20th st, two dwels; o, Edwin Grebble... Poplar, e of 30th st, eight dwels; o, W. H. Belyen....Paul, No. 4,742, dwel; b, George Kessler.

READING, PA.—5th st, br dwel; cost $5,000; o, Wm. Harbster; a, Wm. A. Fink ...3 Penn st, 3 br stores; cost $14,000; o, Homestead B. Association; a, E. Mull....Cottage; cost $1,000; o, G. Fisher; a, Wm. Fink....6th st, br dwel; cost $3,500; o, W. Spohm.

SIOUX CITY, IOWA.—Fouth st, west side, addition to brewery; cost $5,000; o, heirs of Franz Brewery; b, Killian & Poor... Court st cor Seventh, dwel; cost $2,500; o, E. Pomeroy; b, Pierce and Pomeroy....11 and 13 Jennings st, stone build; cost $2,100; o, Dr. Mosher.

TAFTVILLE, CT.—Factory, cost (with its adjuncts) $260,000; o, Ponemak Man'f'g Co; a, Wm. R. Walker; b, Wm. N. Flynt & Co.

WASHINGTON, D. C.—Cor 17th and H sts, apartment house; cost $75,000; o, B. W. Payne; a, Gray & Page; b, Tangby and Gettinger ...Second st and Conn av, 2 br dwel; cost $16,500; o, Robt. J. Fleming; a, Robt. J. Fleming; b, Robt. J. Fleming....Conn av bet N. and R. I avs, 1 br dwel; cost $14,000; o, Mrs. C. R. Hay; a, Robt. J. Fleming; b, Robt. J. Fleming....New Hampshire av and Q st, 1 br dwel: cost $18,000; o, J. W. Field; a, Robt. J. Fleming; b, Robt. J. Fleming....16th st near K, 1 br dwel; cost $25,000; o, Dr. W. W. Johnson; a. Robt. J. Fleming; b, Robt. J. Fleming.

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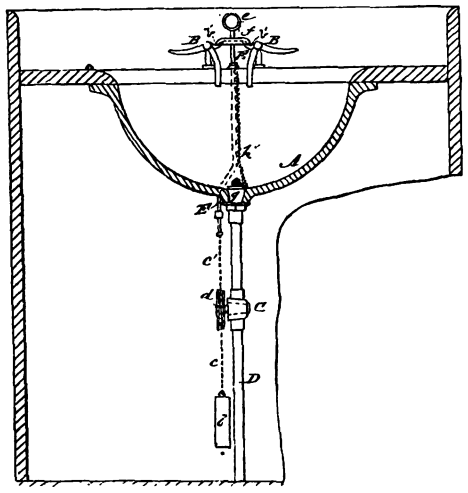
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

266,208. TRAP AND OVERFLOW STOP FOR WASH BASINS, etc. WILLIAM D. SCHUYLER, New York, N. Y. Filed March 1, 1882. (No model.) Issued Oct. 17, 1882.

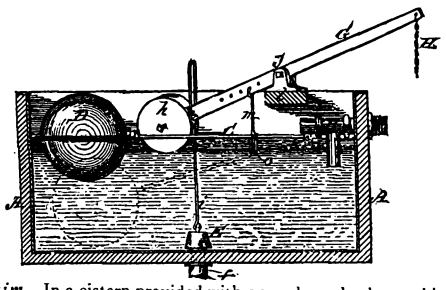


Claim.—1. A vertical rod movable downwardly by a weight and having a stop, *f*, in combination with faucets B, having each an extension, *b*, whereby the faucets will be worked automatically, as described.

2. The waste-pipe valve C, carrying a pulley, *d*, in combination with the weighted cord *c*, attached to a rod raised by the opening of the supply-valves or faucets, whereby the supply and waste pipe valves will open and close simultaneously, as described.

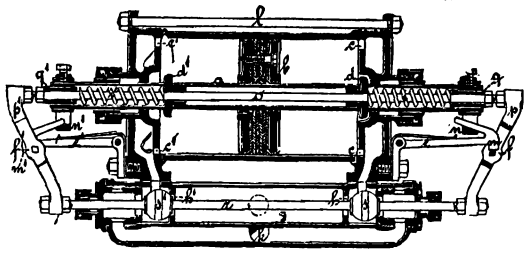
3. The operating-levers of either faucet B, constructed with an extension, b^1, combined and arranged for operation with the self-closing waste-pipe valve C through a loose connection, E c^1, and stop *f*, substantially as described, whereby an adequate opening of the waste pipe valve is insured, as set forth.

266,216. WATER CLOSET CISTERN. SAMUEL F. SNIFFEN, New York, N. Y., assignor to Henry C. Meyer & Co., same place. Filed May 26, 1882. (No model.) Issued Oct. 17, 1882.



Claim.—In a cistern provided with a supply cock, the combination, with the chain lever, the float lever, and the discharge valve, of the looped rods or straps *m* and *i*, whereby the supply cock is held closed whenever the discharge valve shall be opened.

266,278 WATER-METER. JOHANN C. DENNERT and GEORGE G. LIND, Altona, Prussia Germany. Filed Sept. 8, 1881. (No model.) Patented in Germany Dec. 15, 1881, No. 15,285; in England May 30, 1881, No. 2,367, and in Austria-Hungary July 2, 1881, No. 21,554 and No. 38,102. Issued October 24, 1882.



Claim.—1. In water-meters, the combination of the loose piston *b* with the movable hollow piston-rod *a*, inclosing the spring-rod *o*, and the springs *i* and i^1, which parts cause the sudden working of the reversing mechanism, substantially as described.

2. In water meters or motors, the combination of the piston *b* with the piston-rod *a*, the spring-rod *o*, the springs *i* and i^1, the projections *d* and d^1, and the collars *g* and g^1, substantially as set forth.

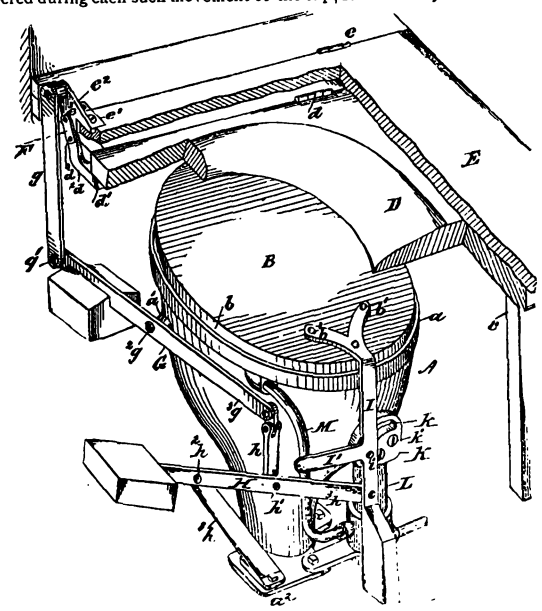
3. In water meters or motors, the combination of the hollow piston-rod *a*, the annular projections *d* d^1, and the collars *g* g^1 with the spring-operated rod *o*, the springs *i* and i^1, the arms *p* p^1, with pins *f* and f^1, the latches *e* e^1, and inclines *n* n^1, substantially as set forth.

266,309. WATER-CLOSET. CHARLES F. PIKE, Philadelphia, Pa., assignor, by mesne assignments, to the National Anti-Sewer Gas Company, of New Jersey. Filed April 12, 1881. Renewed March 23, 1882. (Model.) Issued October 24, 1882.

Brief.—On raising lid E seat D is raised high enough to allow cover B, which rests in a sealing-trough on the rim of bowl A, to be turned down on one side, when the seat resumes its position. On closing lid E the operation is reversed, and the bowl, when not open for use, is always trapped.

Claim.—1. In a water-closet, the combination of bowl A, having sealing-trough *a* and cap B, the seat D and seat-lid E, hinged to casing C and connected to each other, and mechanism interposed between said cap seat and seat lid, adapted to be operated by the movement of said lid, to effect the removal and replacement of said cap from and to said bowl, said seat being partially lifted and returned to its normal position during each such movement of said cap.

2. A water closet provided with a bowl having a sealing-trough and cap, a seat and seat-lid, and mechanism interposed between said cap seat and seat-lid, whereby when the lid is raised or lowered said cap will be moved off from and onto said bowl, and the seat raised and lowered during each such movement of the cap, substantially as set forth.



3. The combination, with a water-closet bowl having a trough surrounding its upper edge, of a cap or valve adapted to seat in said trough, a seat and seat-lid for such bowl, and mechanism interposed between said cap seat-lid and seat, whereby when the seat lid is raised or lowered said cap will be oscillated off from and onto said bowl, and said seat will, during such movement of the cap, be partially raised and then returned to its normal position, substantially as set forth.

4. In a water-closet the combination of a bowl formed with a trough on or around its upper edge, adapted to hold mercury or packing to form a seal, a valve or cap therefor, a seat, seat-lid and mechanism interposed between said cap seat and seat-lid, constructed substantially as shown and described, and adapted to oscillate said cap off from and lower it down alongside of said bowl beneath the casing, said seat rising during such oscillation to permit such movement of said cap, and returning to its normal position when the said movement of the cap is completed.

5. The combination of a water-closet bowl A, having trough *a*, cap B, the movable seat D, lid E, and mechanism interposed between said cap, seat, and seat-lid, substantially as shown and described.

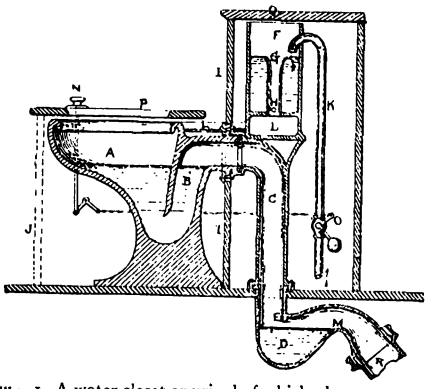
6. The combination, with bowl A, of a hinged seat, D, and seat-lid E, connected to each other by link mechanism F, whereby when said seat-lid is lifted or lowered said seat will be partially raised and returned to its normal position, substantially as shown and for the purpose set forth.

7. The combination, with bowl A, having trough *a*, and cap B, of a movable seat, D, and seat-lid E, levers G H, links *g* *h*, bar I, having stud *i*, and connected to cap B, and slotted bracket K, said parts being arranged substantially as shown and described.

8. A water-closet bowl provided with a projecting conduit, to which is secured a valve *l*, substantially as shown and described, whereby any leakage or drip from said valve will pass into said conduit and then be conducted into said bowl, substantially as set forth.

9. The combination of bowl A, having trough *a*, cap B, and water-cock *l*, the seat D and lid B, bar I, having finger I^1 weighted tripping-lever N, and mechanism interposed between said lid and bar, said parts being arranged substantially as shown and described, and for the purpose set forth.

266,404. WATER CLOSET AND URINAL. GEO. E. WARING, JR., Newport, R. I., assignor to the Drainage Construction Co., Boston, Mass. Filed Jan. 20, 1882. (No model.) Issued Oct. 24, 1882.



Claim.—1. A water closet or urinal of which the contents are discharged by the action of a valveless siphon having a depth of seal or dip greater than the greatest diameter of the siphon.

2. In combination with the bowl of a water closet or urinal whose contents are discharged by the action or a valveless siphon, a siphon which is of uniform diameter throughout its length, substantially as shown.

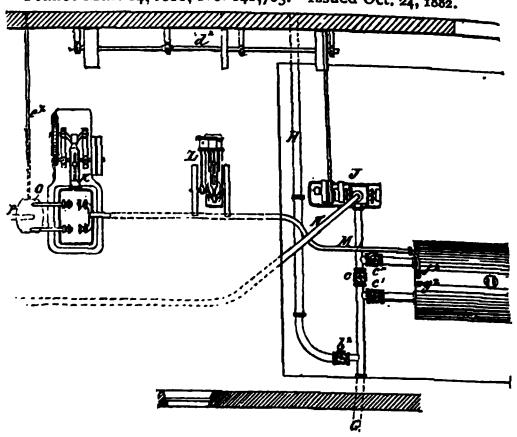
3. In combination with the bowl of a water closet or urinal, a discharging siphon the mouth of whose discharging limb delivers to the weir chamber or a false trap or other form of obstruction so constructed that when the outflow of the siphon is greater than the capacity of the free space between the mouth of the siphon and the bottom of the overflow of the weir chamber or false trap, or between the mouth of the siphon and the obstruction, the mouth of the siphon becomes sealed or closed against the admission of air, substantially as set forth.

4. In combination with the bowl of a water closet or urinal and a siphon by which the same is discharged, a weir chamber or false trap so constructed that the water discharged into it wells up, so as to seal or close the mouth of the outlet at the beginning of the flow, and from which a portion of the water remaining at the end of the flow is discharged, so as to unseal or open the mouth of the outlet, substantially as set forth.

5. In combination with the bowl of a water closet or urinal and a siphon for discharging its contents, a weir chamber or false trap or other obstruction so constructed that the mouth of the siphon is sealed at the beginning of the flow and is unsealed after the flow ceases, substantially as set forth.

6. A water closet or urinal of which the contents are discharged by the action of a valveless siphon so construced that the mouth of the receiving limb of the siphon is not opened for the admission of air until after the water in the bowl is lowered to less than one-half its normal depth, substantially as set forth.

266,416. PNEUMATIC APPARATUS FOR REMOVING NIGHT SOIL FROM CESSPOOLS. JEAN BAPTISTE BERLIER, Paris, France, assignor to the Compagnie Générale de Salubrité, same place. Filed Jan. 12, 1882. (No model.) Patented in France Mar. 14, 1881, No. 141,763. Issued Oct. 24, 1882.



Claim.—1. The pneumatic tube G, combined with purge-pipe A, cock *a*, supply pipe B, and with apparatus, substantially as described, for creating suction in pipe G, as and for the purpose specified.

2. The strainer D, combined with pipes *i j* and gratings *l* and with the pneumatic tube G and pipe B, with which it communicates, substantially as specified.

3. The valve-box C, combined with the valve *c d*, mouth piece *f*, and with the pneumatic tube G and pipe B, with which it communicates, substantially as herein shown and described.

4. The combination of the pipe E, strainer D, valve-box C, pipe B, pneumatic pipe G, water supply pipe A, and valve *a* with apparatus, substantially as specified, for creating a vacuum in the pipe G, as set forth.

5. The combination of pipe C^2, having bend b^3, with the pipes F^2 and E^2, for the passage of gases where the pneumatic tube is siphoned in case of any obstruction in the bend of the siphon, as described.

266,146. COMPOUND FOR FURNACE LININGS AND FIREBRICK. JAMES HENDERSON, Bellefonte, Pa., assignor to Charles G. Francklyn, New York, N. Y. Filed Sept. 6, 1882. (No Specimens.) Issued Oct. 17, 1882.

266,161. ELECTRIC ARC LAMP. OTTO KARTZMARK, New York, N. Y. Filed Feb. 14, 1882. (No model.) Issued Oct. 17, 1882.

266,210. SHIELD FOR PROTECTING TAPER-FLAME OF GAS BURNERS. WILSON D. SCHOOLEY, Richmond, Ind. Filed June 17, 1882. (No model.) Issued Oct. 17, 1882.

266,220. STEAM BOILER TUBE. GEORGE S. STRONG, Philadelphia, Pa. Filed March 6, 1882. (No model.) Issued Oct. 17, 1882.

266,232. PUMP. DAVID E. WASHBURN, Houghton, Mich. Filed Feb. 24, 1882. (No model.) Issued Oct. 17, 1882.

266,235. MAGNETO OR DYNAMO ELECTRIC MACHINE. ADDISON G. WATERHOUSE, New York, N. Y., assignor to the United States Electric Lighting Company, same place. Filed May 24, 1882. (No model.) Issued Oct. 17, 1882.

266,236. CARBON HOLDER FOR ARC LAMPS. ADDISON G. WATERHOUSE, New York, N. Y., assignor to the United States Electric Lighting Company, same place. Filed June 2, 1882. (No model.) Issued Oct. 17, 1882.

266,240. ELECTRIC ARC LAMP. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed July 17, 1882. (No model.) Issued Oct. 17, 1882.

266,242. ELECTRIC LAMP. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed May 23, 1882. (No model.) Issued October 17, 1882.

266,267. AIR PURIFIER. PETER BREEN, Cincinnati, Ohio. Filed April 7, 1882. (No model.) Issued October 24, 1882.

266,268. MANUFACTURE OF GLUCOSE FROM CACTUS. WILLIAM B. BRITTINGHAM, New York, N. Y. Filed April 11, 1882. (No specimens.) Issued October 24, 1882.

266,300. APPARATUS FOR THE MANUFACTURE OF SUGAR. JAMES A. MORRELL, New York, N. Y., assignor to the James A. Morrell Evaporator Company, same place. Filed Feb. 21, 1882. (No model.) Issued October 24, 1882.

266,303. APPARATUS FOR CREATING VACUUMS IN INCANDESCENT ELECTRIC-LAMP GLOBES. HANS J. MULLER, New York, N. Y., assignor to himself and Alexander Lovett, same place. Filed April 11, 1882. (No model.) Issued October 24, 1882.

266,304. GAS-ENGINE. PETER MUNZINGER, Philadelphia Pa. Filed March 2, 1882. (No model.) Issued October 24, 1882.

266,353. ELECTRIC CABLE. PATRICK B. DELANY, New York, N. Y. Filed Oct. 31, 1881. (No model.) Issued Oct. 24, 1882.

266,359. HOSE COUPLING. THEODOR GOTZEL, New York, N. Y. Filed June 6, 1882. (No model.) Issued Oct. 24, 1882.

266,369. LIME-HEATING FOOT STOVE. PHILLIP O. JENKINS, Washington, D. C. Filed Oct. 12, 1881. Renewed Oct. 2, 1882. (No model.) Issued Oct. 24, 1882.

266,377. SIPHON PUMP. ALEXANDER MACKELLAR, Brooklyn, N. Y. (John MacKellar, administrator of said MacKellar, deceased.) Filed Jan. 25, 1882. (No model.) Issued Oct. 24, 1882.

266,393. HEATING STOVE. EWALD SCHONEBERG, Bockenheim, Germany, assignor to himself and Otto Cullman, Cullman, Ala. Filed July 15, 1882. (No model.) Patented in England, Feb. 28, 1882, No. 967; in Belgium Mar. 15, 1882, No. 57,216, and in France May 9, 1882, No. 147,640. Issued Oct. 24, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING FEBRUARY 24, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	18	27.0	3	16.6																		
Boston.....Mass	407,581	169	21.8	51	30.1	5	1	32	4		6	3	1		2	15		12		1	2		
Cambridge.....Mass	57,432	23	20.8	8	34.7			4		1	2					1		4			1		
Worcester.....Mass	64,995	36	28.6	6	16.6		1	4	1				1			5	1				2		
New Haven.....Conn	66,979	34	26.0	12	35.2			2	1		1	1	1			5		5					1
Providence.....R. I.	*116,755	35	15.1	11	31.4	1		8	1	1		1	1			5		1					
Total	748,261	315	21.8	81	25.7	6	2	50	7	2	9	5	4		2	31	1	22		1	5		1
EASTERN CITIES.																							
Albany.....New York	98,430	42	21.8	19	45.2	2		6	3		1		4					2					
New York.....New York	1,299,249	678	27.0	245	36.1	31	5	118	17	18	20	2	5	7	21	94				12	13		13
Brooklyn.....New York	633,763	262	21.3	89	33.9			38	6	3	9	3	1	4	13	34					9		6
Hudson Co.....New Jersey	228,025	98	21.8	37	37.7	2	1	14	2	1	1				3	17		3			1		
Newark.....New Jersey	147,744	83	29.1	27	32.5	1	3	12	3	2	2	2		3	5	7		8	1				
Camden.....New Jersey	54,012	14	13.0	5	35.7		1	1					1					1					
Paterson.....New Jersey	58,324	22	19.2				1	3								3							1
*Philadelphia.....Pa.																							
Wilmington.....Delaware	46,889	21	22.9	5	23.8			5													1	3	
Total	2,563,436	1,220	24.4	427	35.0	36	11	197	31	24	33	7	11	14	42	155		14	1	12	24	3	20
LAKE CITIES.																							
*Buffalo.....New York																							
Rochester.....New York	92,116	30	16.1	7	23.3			4			1					1		2					
Syracuse.....New York	54,696	17	16.1	5	29.4			4	2					1		1							1
*Cleveland.....Ohio																							
Detroit.....Michigan	131,118	51	19.7	22	43.1			5			9	1			2	4		2					
Chicago.....Illinois	597,834	200	17.1	83	41.5	10	5	19	1	2	6	1	7	1	7	16	5	8			7	1	1
Milwaukee.....Wisconsin	135,233	45	17.1	21	46.6		1	6	1	1	3	2			4	1	1	3			1		
Total	1,010,997	343	17.1	138	40.2	10	6	38	4	3	19	4	7	2	13	23	6	15			8	1	2
RIVER CITIES.																							
Allegheny.....Pa.	89,038	35	20.3	15	42.8	1		6		1			1			6		1					
Pittsburgh.....Pa	191,523	58	15.6	21	36.2	4	1	5					6			6	1	1					4
Cincinnati.....Ohio	267,767	93	16.7	31	33.3	1		16	2	2	3	2	1		6	15	1	1		2	3		2
Dayton.....Ohio	41,648	8	9.8	3	37.5	1		2								1							
Louisville.....Ky	131,529	51	19.7	14	27.4	4		12		2			1			5						4	2
Indianapolis.....Indiana	86,529	28	16.6	8	28.5			6		2	2		1			5		2					
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	29	15.1	13	44.8	1	1	3	3		1		4	1		3						1	1
*St. Paul.....Minn																							
St. Louis.....Mo.	362,816	139	19.7	41	29.4	4		22	1	3	13		5	3	7	23		6					
Total	1,269,876	441	17.7	146	33.3	16	2	72	6	10	19	2	19	4	13	59	2	11		2	3	5	9
PACIFIC CITIES.																							
San Francisco.....Cal.....(Feb. 16th)	270,325	92	17.7	23	25.0			4		4		1	3	1		12		3			1		
SOUTHERN CITIES.																							
District of Columbia.....Wh.	136,471	33	12.5	8	24.2	1		10			2				3	4							
" " .....Col.	71,108	26	18.7	11	42.3			10					1			2		1					
Richmond, ...Va. Wh.	38,526	12	15.6	4	33.3											2	1		1				
" .....Va. Col.	29,394	21	36.9	8	38.0	2	1	4								2							
Charleston.....S. C. Wh.	22,699	5	11.4			1												1					
" .....S. C. Col.	27,595	13	24.4	4	30.7			5								1							
Atlanta.....Ga. Wh.	25,583	7	14.0	3	42.8	1		1								1	1					3	
" .....Ga. Col.	19,221	7	18.7			1		2		1			1			2							
Savannah.....Ga. Wh.	15,041	9	30.7					1		1								1					
" .....Ga. Col.	16,506	12	37.5							1						1							
Nashville.....Tenn. Wh.	31,993	12	19.2	3	25.0			3							1	4		1				1	
" .....Tenn. Col.	19,406	6	16.0	5	83.3			1															
Memphis.....Tenn. Wh.	18,677	14	38.5	2	14.2						1			1		3		1					
" .....Tenn. Col.	14,896	16	55.7	7	43.7	1		1		1						3							1
Mobile.....Ala. Wh.	16,927	9	27.6	2	22.2			1															
" .....Ala. Col.	14,368	4	14.0					1															
New Orleans.....La. Wh.	163,757	77	27.4	13	16.8		1	11		3	2			2	1	4			2			10	
" " .....La. Col.	59,866	67	57.3	17	25.3	3	1	2				1			1	5			1			30	
Total White	469,684	178	19.2	35	19.6	3	1	27		4	5			3	5	18	2	4	3			14	
Total Colored	272,355	172	32.8	52	30.2	7	2	26		3		1	2		1	16			1			30	1
Total in 37 U. S. Cities	6,604,934	2,761	21.3	902	31.3	78	28	404	48	50	85	20	46	24	76	304	11	69	5	15	41	53	33
Feb. 10,—Total in 28 English Cities	8,620,975	3,882	23.5			141				33	25		76		80					46		7	116
Feb. 10, " 8 Scotch Cities	1,233,088	683	28.8			18				13	18		13		12			164		1			50
Feb. 10, " 16 Irish Cities	854,731	593	36.1			9		87		13	1		9		9			165		5		2	19
Jan. 20, " 169 German Cities	8,516,807	4,267	26.1	1,850		111		668	21	133	182		54		75			101		48	17	5	49

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending February 24, of an urban population of 6,604,934, there died 2,761, which is equivalent to an annual death rate of 21.3 per 1,000, a little less than that for the preceding week, which was 21.8.

14.6 per cent. of the total mortality was due to consumption, 11 per cent. to pneumonia, 3 per cent. to diphtheria, 2.7 per cent. to scarlet fever, 1.9 per cent. to small-pox, 1.6 per cent. to typhoid fever, and 1.1 per cent. to whooping cough.

For the North Atlantic cities the death rate was 21.8; for the Eastern cities, 24.4; for the lake cities, 17.1; for the river cities, 17.7, and in the Southern cities, for whites, 19.2, and for the colored, 32.8 per 1,000.

Cincinnati reports a death rate of only 16.7. 40 of the 53 cases of small-pox reported occurred in New Orleans. The death rate in New York City is high, 27 per 1,000; and even higher in Newark, where it is 29.1. In San Francisco the death rate for the preceding week was 17.7, and only 4 deaths are reported as due to consumption.

NEW YORK CITY.—Dr. John T. Nagle reports that the accidents in the table include 16 children killed by suffocation and injuries during a panic in school.

NEW YORK CITY LUNATIC ASYLUM.—Dr. Franklin reports 11 admissions, nine discharges, one death and 1,333 insane patients remaining under treatment.

BOSTON, MASS.—C. E. Davis Jr. reports 40 cases of diphtheria, 24 of scarlet fever and three of typhoid fever.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 20 new cases of scarlet fever and eight of diphtheria, making 13 of the latter disease and 45 of the former under treatment.

DETROIT, MICH.—Dr. O. W. Wight reports 18 new cases of diphtheria 18 of scarlet fever and one of small-pox.

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LYNCHBURG, VA.—Since Feb. 12 four cases of small-pox have occurred, one of which proved fatal during the past week.

LOUISVILLE, KY.—Dr. Montgomery reports eight cases of small-pox as having occurred during the week.

The report from Louisville for the week ending Feb. 17 did not arrive in time for entry in our table. There were 72 deaths reported, 14 in persons under five years. Consumption caused 14 deaths, croup one, typhoid fever three, malarial fever two, pneumonia six, congestion of lungs one, small-pox two and whooping cough one, 10 new cases of small-pox were reported during the week.

DAYTON, OHIO.—Dr. E. B. Davis reports the appearance of a case of small-pox in the city.

PITTSBURG, PA.—Dr. Snively reports 10 new cases of small-pox.

WHEELING, WEST VA.—Dr. T. O. Edwards reports that small-pox has entirely disappeared from the city.

MOLINE, ILL.—Dr. L. D. Dunn reports pneumonia as prevailing, four deaths having occurred from this disease out of a total of seven during the week. The small-pox cases have recovered and quarantine has been raised.

ROCK ISLAND, ILL,—Dr. G. G. Craig reports nine deaths for the week; under five years three; one fatal case of cerebro-spinal meningitis is reported.

HUDSON, CO. N. J.—C. J. Rooney's arrived too late for tabulation last week (Feb 17). Total mortality 89 ; under five years 38. Accident one, consumption 16, croup two, diphtheria seven, typhoid fever four, scarlet fever four, pneumonia 11, congestion of lungs one, acute bronchitis six, and measles two deaths.

MASSACHUSETTS.—The weekly returns of vital statistics prepared by Dr. S. W. Abbott of the State Board of Health, Lunacy and Charity show 405 deaths during the week ending Feb. 17, in 41 cities and towns of Massachusetts aggregating a population of 1,309,495. Fifty-eight deaths were recorded from the principal zymotic diseases, diphtheria and croup 24, scarlet fever 11, typhoid fever five, purpual fever five, cerebro-spinal meningitis four, diarrhœal diseases four, whooping cough two, erysipelas two, malarial fever one. Death rates for the week ; Boston 27.37, Lowell 17.47, Worcester 17.84, Cambridge 20.69, Fall River 26.53, Lawrence 19.82, Lynn 19.01, Springfield 10.81, Salem 20.73, New Bedford 19.35, Somerville 22.89, Holyoke 26.17, Chelsea 9.52, Taunton 17.16, Gloucester 13.45, Haverhill 25.25 Brockton 19.11, Newburyport 19.17, Malden 4.33. The total death rate for the week was 16.09 against 21.25 and 20.78 for the previous two weeks.

MICHIGAN.—Dr. H. B. Baker's report for the week ending Feb. 17 shows the prevalence of bronchitis, neuralgia, rheumatism, consumption, intermittent fever, tonsilitis, influenza and pneumonia.

One case of measles was found among immigrants arriving at Port Huron during the week.

BERLIN, GREEN LAKE CO., WIS.—G. J. Thomas, P. M., reports under date of Feb. 21 that small-pox is prevailing in the city to an extent amounting to almost an epidemic. Thirty-three cases have occurred to date, three of which have proved fatal. The city and health officers are using every means to prevent its further spread, but its prevalence among citizens of Polish and German extraction, who are often averse to vaccination, operates greatly against their efforts to suppress the contagion.

READING, PA.—According to the report of Secretary Howell 19 deaths occurred in the city during the week ending Feb. 20 ; males 12, females seven ; under five years nine, over 60 years five. Four deaths were caused by convulsions, two by consumption, two by pneumonia, two by scarlet fever and one by typhus fever.

BALTIMORE, MD.—During the week ending Feb. 24 there were 171 deaths ; males 91, females 80 ; under five years 78, over 60 years 33. The annual rate as caculated by the local authorities is for the whole population 21.74 ; for the white 16.09, for the colored 54.60. Small-pox caused 25 deaths, bronchitis one, pleurisy one, pneumonia 20, congestion of lungs one, consumption 24, croup seven, diphtheria ten, measles one, scarlet fever 11, whooping cough one. No deaths are reported from typhoid fever, diarrhœa, puerperal fever or eryesipelas. Violence caused three deaths.

ONTARIO, CANADA.—The *Provincial Bulletin* for the week ending Feb. 17, states the prevalent diseases to have been bronchitis, neuralgia, influenza and anæmia. Measles, mumps, scarlet fever and diphtheria increased in their area of prevalence during the week.

VERA CRUZ, MEXICO.—During the month of January there were 106 deaths ; males 66, females 40, adults 73, children 33. Yellow fever caused five deaths, malarial fevers eight, dysentery one. No deaths are reported from scarlet fever, typhoid fever, small-pox, measles, whooping cough or diphtheria.

RIO DE JANEIRO, BRAZIL.—Deputy Consul-General Jas. H. Murray sends reports for the weeks ending Jan. 6, 13 and 20. Population 330,000.

Jan. 6. Total mortality 212 ; small-pox caused 21 deaths, pernicious fever five and consumption 42.

Jan. 13. Total mortality 256. Small-pox caused 22 deaths, pernicious fevers eight and consumption 37.

Jan. 20. Total mortality 245. Small-pox caused 26 deaths, pernicious fevers four and consumption 27.

Small-pox and pulmonary affections are reported as the prevailing diseases.

VALPARAISO, CHILI.—Vice Consul August Moller, Jr., reports 587 deaths for the month of Dec., in a poputation of 101,088. Of these 75 were caused by small-pox, 88 by lung diseases, 68 by consumption, and 147 by fevers.

HONOLULU, H. I.—Gonsul D. A. McKinley reports 46 deaths for the month of January ; under five years seven, over sixty years eight; males 32, females 14. Dysentery caused two deaths, bronchitis two, and consumption seven. No deaths are reported from small-pox measles, scarlet fever, etc.

VICTORIA, VANCOUVERS' ISLAND —Consul Allen Francis reports Feb. 10 that small-pox is understood to be prevailing in Washington Territory and on the main land of British Columbia.

ENGLAND AND WALES.—The return of the Registrar-General for the quarter ending Dec. 31, shows the registered deaths to have numbered 133,267 equal to an annual rate of 20.0 per 1,000 of the estimated population 26,406,820. This death rate was 0.9 below the mean rate in the 10 preceeding corresponding quarters, but exceeded by 1.3, the exceptionally low rate in the fourth quarter of 1881.

The 133,267 deaths included 68,393 males and 64,874 females, giving the respective rates of 21.1 and 19.0 per 1,000 estimated to be living of each sex. In equal numbers living, the deaths were 111 of males to 100 of females.

In the urban population, estimated at fifteen and a half millions of people, the death rate was equal to 21.7 per 1,000, while in the remaining and chiefly rural population estimated at about ten and a half millions, the rate did not exceed 17.5. In equal numbers living the deaths were 124 in the urban to 100 in the rural population as compared with an average of 128 to 100 in the corresponding quarters of the preceeding 10 years. The death rate in the 28 great towns was 1.2 above the general urban rate. It did not exceed 21.8 in London, whereas it averaged 23.9 in the 27 provincial towns.

Among the deaths were 31,460 of infants under one year of age, 66,618 of children and adults between one and 60 years, and 35,189 of persons over 60.

Scarlet fever caused 4,053 deaths, or 0,61 per 1,000 (annual rate against an average of 0,92 in the corresponding quarters of the 10 preceeding years. Diarrhœa caused 2,814 deaths, equal to an annual rate of 0.41 as compared with the average, before mentioned, of 0.54. Measles caused 2,774 deaths, rate 0.42, average 0.37 ; fevers, including typhus, typhoid, and continued, 2,525, rate 0.38, average 0.51 ; whooping cough, 2,431, rate 0.37, average 0.38 ; diphtheria, 1,002, rate 0.15, average 0.13 ; small-pox 190.

There were 217,591 births registered giving an annual rate of 32.7. This rate is lower than that recorded in the fourth quarter of any year since 1861, excepting only 1880, when the rate was but 32.1. In the 28 great towns the birth rate averaged 34.8, and was 2.1 above the general English rate. The London rate was 34.2 and the average of the 27 provincial towns 35.3.

During the week ending Feb. 10, the mortality in the 28 large towns averaged 23.5 per 1,000. Derby registered the lowest rate, 13.4, and) Liverpool the highest 33.3. No death in Norwich was referred to any of the principal symotic diseases.

London.—There were 2,888 births and 1,631 deaths in London during this week ; the former exceeded by 44, whereas the latter were so many as 376 below the average numbers of the corresponding weeks of the past 10 years. The annual rate was 21.5. The deaths included two from small-pox, 29 from measles, 33 from scarlet fever, 14 from diphtheria, 42 from whooping cough, 20 from enteric fever, none from typhus, 14 from diarrhœa and dysentery, 390 from diseases of the respiratory organs, and 64 from violence.

SCOTLAND.—During the week ending Feb. 10 the death rate in the eight principal towns was 28.8 or 4.1 above that for the corresponding week of last year. The lowest mortality was recorded in Perth, 25.5 and the highest in Paisley, 30.8. For an abstract of this return see our table given above.

The return of the Registrar-General for the month of January shows the registration of 3,995 births and 2,989 deaths in the eight principal towns. Of the deaths 1,473 were of males, and 1,516 of females. The mortality was at the annual rate of 22 per 1,000 in Edinburgh, 23 in Leith, 27 in Paisley and Perth, 28 in Aberdeen, 30 in Greenock, 32 in Glasgow, and 34 in Dundee. Forty-two per cent. of the total mortality occurred in children under five years of age. Whooping cough was the most fatal epidemic, having caused 232 deaths ; fever caused 38 deaths, of which 10 were tabulated as typhus ; scarlet fever caused 56 deaths, diarrhœa 47, measles 45, croup 40, diphtheria 37, dysentery six, British cholera one, consumption 279, inflammatory affections of the respiratory organs 763, and violence 72.

IRELAND.—Consul A. B. Wood of Belfast transmits return of Registrar-General for the week ending Feb. 3, a summary of which was included in our table of last week.

Dublin.—Deaths 220 ; rate 32.7. No deaths were caused by small-pox, measles or diphtheria. Whooping cough caused 16 deaths, diseases of respiratory organs 62.

Belfast.—Deaths 130 ; rate 31.6. Scarlet fever caused eight deaths, whooping cough nine, and diseases of the respiratory organs 46.

Consul Wood transmits also the Registrar-General's return for the week ending Feb. 10. For summary see table.

Dublin.—Deaths 246 ; typhus eight, whooping cough 11, enteric fever and diarrhœa six each, consumption 38, diseases of the respiratory organs 73, and violence three. No deaths are reported from small-pox, measles, scarlet fever or diphtheria. Annual rate 36.6.

Belfast.—Deaths 166 ; small-pox two, measles three, scarlet fever nine, typhus none, whooping cough seven, diphtheria one, typhoid fever three, diarrhœa four, consumption 23, diseases of respiratory system 50, and violence five. Annual rate 40.3.

RHEIMS, FRANCE.—Consul John L. Frisbie reports the occurrence of 59 deaths during the week ending Feb. 3; males 35, females 24 : under five years 21, over 60 years 21. Annual rate 32.69. No deaths are reported from measles, scarlet fever, whooping cough, erysipelas or diarrhœa. Croup and diphtheria caused eight of the 59, consumption five, pneumonia three, small-pox one, and typhoid fever two.

BORDEAUX, FRANCE.—Consul G. W. Roosevelt transmits a copy of the monthly bulletin for January. There were 472 deaths excluding 52 still-births, population 221,305. No deaths occurred from small-pox, measles or whooping cough. Scarlet fever caused two deaths, typhoid fever 14, croup ten, puerperal fever two, erysipelas one, consumption 76, acute bronchitis 20, pneumonia and pleurisy 39, diarrhœal diseases three, and violence 13.

LEIPZIG, SAXONY.—Vice-Consul Fred Nachor transmits a copy of the mortality return for 1882. During the year there occurred 3,295 deaths, males 1,827, females 1,468 ; under five years 1,389, over 60 years 519; population 160,296. Small-pox caused two deaths, measles 19, scarlet fever 48, diphtheria and croup 121, whooping cough 57, typhoid fever 33, dysentery six, puerperal fever 36, consumption 606, acute diseases of the respiratory organs 360, and violence 143.

ST. PETERSBURG, RUSSIA.—Consul-General Edgar Stanton reports 743 deaths during the week ending Jan. 27. Of the decedents 370 were under five years of age, and 70 over 60 years ; 386 were males and 357 females, population 929,525. Small-pox caused 17 deaths. On Jan. 28 there remained under treatment in the hospitals 90 cases of small-pox, 1,200 of fever and 1,217 of venereal diseases.

COPENHAGEN, DENMARK.—During the week ending Jan. 23 there were 142 deaths in a population of 258,000; under five years 64, over 60 years 36. Measles, scarlet fever, croup, typhoid and puerperal fever caused one death each, diarrhœa and whooping cough four each, diphtheria three and erysipelas two, consumption 16, bronchitis five, pneumonia 11 and violence four.

Among the cases of contagious and epidemic diseases reported by the physicians during the same week were two of measles, 14 of scarlet fever, 13 of diphtheria, three of croup, 61 of whooping cough, nine of typhoid fever, 91 of diarrhœal disease, 23 of erysipelas, 625 of bronchial catarrh, 47 of pneumonia and 177 of tonsilitis.

COPENHAGEN, DENMARK.—During the week ending January 30 there occurred 132 deaths ; under five years 58, over 60 years 36. Population 258,000. Diphtheria, typhoid and puerperal fevers caused two deaths each, scarlet fever one, whooping cough three, diarrhœal diseases four, consumption 18, bronchitis eight and pneumonia 11. The following cases were reported by the physicians : small-pox none, measles two; scarlet fever 21, diphtheria 16, croup one, whooping cough 66, typhoid fever ten, diarrhœal diseases 87, erysipelas 23, puerperal fever three, bronchial catarrh 799, pneumonia 70 and tonsilitis 152.

ROTTERDAM, NETHERLANDS.—Consul Jno. F. Winter sends reports for the weeks ending Jan. 27 and Feb. 3. During the latter there were 109 deaths in a population of 157,270. Eleven cases of were small-pox are recorded and six deaths from that disease. During the former there were 98 deaths, of which seven were from small-pox. Seventeen cases of this disease are reported.

VIENNA, AUSTRIA.—The report for the week ending Jan. 20 shows the occurrence of 418 deaths in a population of 749,762, equal to an annual rate of 29.0. Of the deaths 143 were in children under five years. Small-pox caused three deaths, measles none, scarlet fever five, diphtheria three, whooping cough and typhoid fever two each, consumption 111, and acute diseases of the respiratory system 82.

Consul-General Weaver's report for the week ending Jan. 27 shows the occurrence of 465 deaths, equal to an annual rate of 32.3. Small-pox caused five deaths, measles nine, scarlet fever two, typhoid fever two, diphtheria three, whooping cough four, consumption 103 and acute lung disease, 89. Of the deaths 180 occurred in children under five years of age.

VIENNA, AUSTRIA.—Consul General Jas. R. Weaver sends report for the week ending Feb. 3, showing 419 deaths, equal to an annual rate of 29.1 ; under five years 157 ; small-pox caused four deaths, measles one, scarlet fever one, diphtheria six, whooping cough five, tyhoid fever four, typhus fever one, consumption 103, and acute lung diseases 85. Mr. Weaver states that during the past month typhus fever introduced by tramps has given the health authorities great concern.

VENICE, ITALY.—Consul W. H. De Wolf Budd transmits report for the week ending Jan. 27. Total deaths 81 ; males 44, females 37, population 139,513. Annual rate 30.2. The city is free from small-pox, measles, scarlet fever, diphtheria, croup and typhoid fever. Lung diseases are the principal causes of death.

WARSAW, RUSSIAN POLAND.—Consul Rawier reports 219 deaths during the week ending Jan. 20, in a population of 383,973. Only one of the deaths was caused by small-pox.

ST. PETERSBURG, RUSSIA.—Consul-Gen. Stanton sends reports for the weeks ending Jan. 6, 13 and 20.

Jan. 6. Total deaths 694 ; males 369, females 325; under five years 307, over 60 years 91. Small-pox caused 25 deaths. On Jan. 7 there remained under treatment in the hospitals 67 cases of small-pox and 957 of fever.

Jan. 13. Deaths 737 ; males 418, females 319; under five years 340, over 60 years 74. Small-pox caused 28 deaths. On Jan. 14 there were 70 cases of small-pox and 1,112 of fever under treatment in the hospitals.

Jan. 20. Deaths 778 ; males 450, females 328; under five years 328 ; over 60 years 91. Small-pox caused 29 deaths. On Jan. 21 there were 80 cases of small-pox and 1,192 of fever under treatment. Population of the city 927,467.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits report for the week ending January 27, showing a total of 117 deaths, males 63, females 54, under five years 53, over 60 years 20. Annual rate 34.9. Measles caused five deaths, scarlet fever three, puerperal fever and whooping cough one each, diphtheria and croup four, typhoid fever three, diarrhœa five, consumption ten, bronchitis 11 and pneumonia 19.

During the week ending February 3 the following cases were reported : measles 68, scarlet fever 29, erysipelas three, whooping cough nine, diphtheria nine, typhoid fever three, diarrhœa and pneumonia 22 of each, bronchitis 119 and tonsilitis 20.

BRUSSELS, BELGIUM.—The bulletin for the week ending February 3 shows 197 deaths in the city and its *faubourgs*, equal to an annual rate of 25.1. Small-pox caused six deaths, measles four, fever one, croup three, whooping cough three, diarrhœal diseases 22, bronchitis and pneumonia 34 and consumption 28.

CALCUTTA, INDIA.—During November there were 1,244 deaths registered giving an annual ratio of 34.4 against 31.8 during the preceding month. The proportion of males to females was as 144 to 100. Cholera prevailed sporadically and with more than its usual severity in the northern sections of the town. It caused 232 deaths against 91

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in the preceding month. This number exceeds the mean of the corresponding month of the decade by 86. Fevers caused 369 deaths as compared with 312 in the previous month. Bowel complaints 147 as against 150. Mortality from other causes 470 as against 374.

Consul-General Mattson transmits reports for the weeks ending respectively December 30, January 6 and 13.

December 30: Total deaths 334, giving a ratio of 40.2 as compared with 43.2 during the previous week. Cholera is reported as abating but is still considerably in excess of the average. The number of deaths from fevers amounted to 77, from diarrhœal diseases 51, from tetanus 23 and from cholera 79.

January 6: The number of deaths registered was 321 giving a ratio of 38.6. Fevers caused 71 deaths, diarrhœal diseases 46, tetanus 26 and cholera 61.

January 13: Total deaths 303. Annual rate 36.3. Fevers caused 80 deaths, diarrhœal diseases 44, tetanus 21 and cholera 49.

MADRAS, INDIA.—The reports for the three weeks ending December 29, January 5 and 12 have been received.

December 29: Total deaths 257; males 130, females 127; annual rate 33.6. Small-pox caused two deaths, measles none, fevers 87, dysentery 28, diarrhœa 14 and cholera none.

January 5: Total deaths 312; males 159, females 153. Annual rate 40.8. Small-pox caused seven deaths, measles one, fevers 66, dysentery 22, diarrhœa 24 and cholera none.

January 12: Total deaths 285; males 142, females 143. Annual rate 37.3. Small-pox caused four deaths, measles two, fevers 73, dysentery 27, diarrhœa 11 and cholera none.

SINGAPORE, INDIA.—Consul A. G. Studer sends report for the month of December showing 365 deaths in a population of 139,000. Of these 96 were caused by fever, 38 by consumption, 32 by convulsions, 32 by diarrhœa, nine by dysentery, four by small-pox and two by leprosy. The health of the town is considered as satisfactory.

BOMBAY, INDIA.—Consul B. F. Farnham reports for the weeks ending January 16 and 23.

January 16: The number of deaths registered was 467, or nine less than the average of the corresponding periods in the preceding five years. Annual rate 29.86. There were 100 deaths from remittent fever, 62 from diseases of the respiratory system, 29 from diarrhœa and 15 from dysentery. Small-pox caused 33 deaths.

January 23: Total deaths 491 or ten in excess of the mean of the corresponding weeks of the preceding five years. Annual rate 30.12. Remittent fever caused 99 deaths, diseases of the respiratory organs 74, diarrhœa 28, dysentery 11 and small-pox 32.

COLOMBO, CEYLON.—During the week ending January 13 there were 34 cases of small-pox with four deaths, and during the following week ending January 20, 30 cases with two deaths.

SHANGHAI, CHINA.—Vice-Consul-General F. D. Cheshire reports under date of January 9, that there were eight cases (foreigners) of small-pox in hospital and that the disease is prevalent among the natives in one part of the foreign settlement.

During the week ending January 16 one new case of small-pox was reported.

SIDNEY, NEW SOUTH WALES.—Vice-Consul F. H. Boyd transmits the return of the Registrar-General for the month of November. The births numbered 816 and the deaths 394. In the city 178 deaths occurred; males 117, females 61; under five years 84; population 103,379. In the suburbs 216 deaths were registered; males 120, females 96; under five years 131; population 120,832. Diarrhœa was the most fatal zymotic disease, it having caused 17 deaths in the city and 24 in the suburbs. Cholera is reported as having occasioned two deaths in the suburbs.

BRISBANE, NEW SOUTH WALES.—There were 106 deaths registered in the city and suburbs during the month of November; males 64, females 45; under five years 64; population 33,068. Of the 106, zymotic diseases caused 45, but the report does not particularize the diseases.

MELBOURNE, AUSTRALIA.—During the month of November there were 578 deaths in the city and suburbs; males 325, females 253; under five years 285, over 75 years 22; population 284,874. As compared with the previous month a large increase took place in deaths from all classes of disease. Zymotic diseases rose from 42 to 119. Measles caused one death, croup two, whooping cough two, typhoid fever five, erysipelas six, dysentery eight, diarrhœa 71, cholera eight (sic), consumption 55, bronchitis 16, pleurisy eight, pneumonia 26, congestion of the lungs eight and violence 25.

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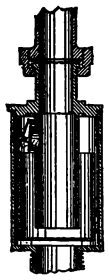

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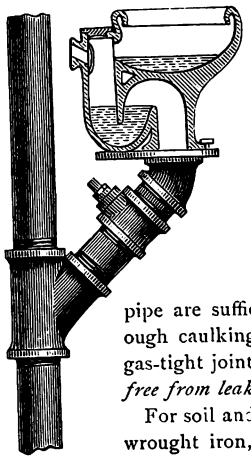

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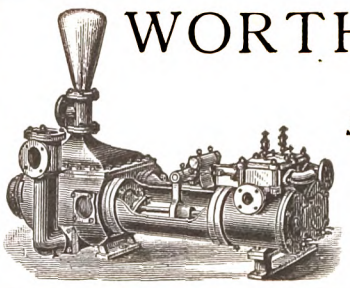

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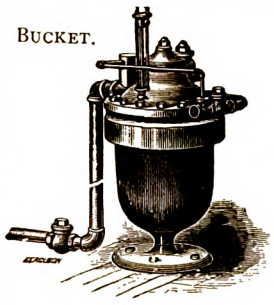
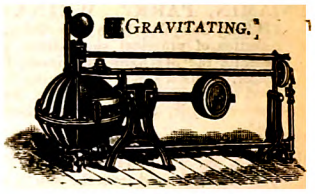
BRASS GOODS.
DEALERS IN
Plumbers', Steam and Gas Fitters' Supplies.
Sole Manufacturers of the Montgomery Patent Gauge, Cooler and Ball Cocks.
Agents for the Joel Hayden Brass Works, Lorain, O.

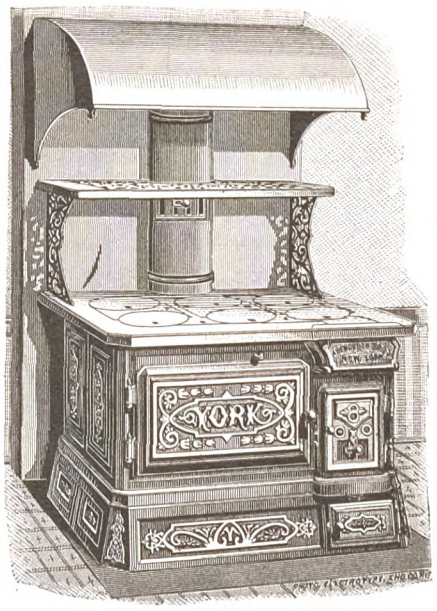
BUCKET.



The Albany Steam Trap Co.'s
BUCKET AND GRAVITATING TRAPS.
Automatically drains the water of condensation from HEATING COILS, and returns it to the boiler, whether coils are *above or below* the water level in boiler, doing away with pumps and other mechanical devices for such purposes.
ALBANY STEAM TRAP CO., Albany, N. Y.



TO ARCHITECTS, BUILDERS and OTHERS.



THE YORK RANGE
FOUR DIFFERENT STYLES FOR APARTMENT HOUSES.

FURNISHED WITH RIGHT OR LEFT HAND FIRE BOX.
Pronounced by all the most complete ever introduced. Having the Celebrated Duplex Grate, either for Wood or Coal, Economical Fire Chamber, Capacious Water Back, giving an abundance of Hot Water, Extra Size Oven, Automatic Oven Shelf and Large Front Feeder. All Ranges furnished with Nickel Trimmings.
This Range is made in four styles:—With BASE, with LOW WARMING CLOSET, with ELEVATED WARMING CLOSET, and with HOOD and WARMING SHELF.
Architects, Builders, and those interested are invited to call at our show rooms.

ABENDROTH BROTHERS,
IRON FOUNDERS,
NOS. 109 AND 111 BEEKMAN STREET, - - - - - - - NEW YORK.
MANUFACTURERS OF
IRON SOIL PIPE AND PIPE FITTINGS,
BOILER STANDS, SINKS, BATH TUBS, AND A FULL LINE OF PLUMBERS' IRON WARE.
EXTRA HEAVY PIPE and FITTINGS A SPECIALTY.

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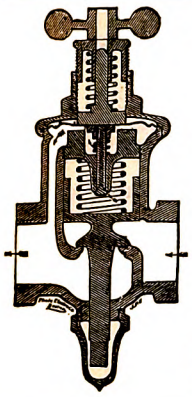
Proving and Clearing Pumps.
Plumbers' Alcohol Torches, Copper Balls, Soil Cups and Water Closet Cups.
—*The Jobbing Trade Solicited.*—
Send for Catalogue.



CURTIS PRESSURE REGULATOR,
Steam, FOR Water and Air,
MANUFACTURED BY
CURTIS REGULATOR CO.,
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CHAPMAN VALVE M'F'G CO.,
Straightway Valves and Hydrants,
AND
DEALERS IN SUPPLIES OF EVERY DESCRIPTION,
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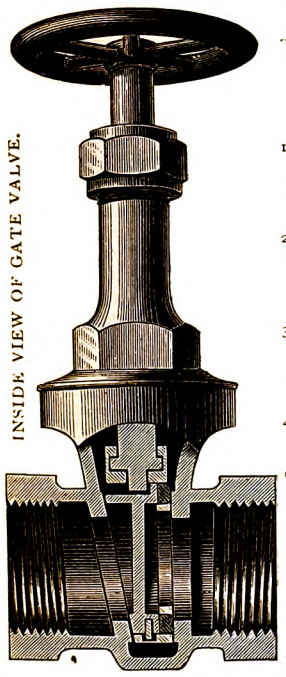
JENKINS' PATENT

(BRASS, AND IRON BODY BRASS MOUNTED,)
GATE, GLOBE, ANGLE, HORIZONTAL, CHECK AND SAFETY VALVES.



INSIDE VIEW OF GATE VALVE.

The advantages these valves possess over all other gate valves, are—

1st. They do not depend on a metallic disc for a joint, but use the Jenkins' Compressible Packing

2d. As the disc of packing wears, the inclined follower (or metal seat,) keeps the disc to its seat, making a perfect joint.

3d. Should the discs give out at any time, they can be replaced very quickly, and at a small cost.

4th. They do not have to be taken from their places to be repaired.

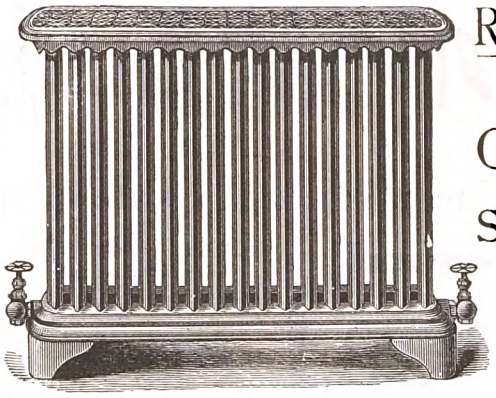
5th. When the valves are only partly open steam rushing through does not come in contact with the disc, so that it is impossible for the steam to wear holes through it or cut it out, as is too commonly the case with metal disc valves.

—SAMPLE ORDERS SOLICITED.—

Manufactured by the
EATON, COLE & BURNHAM CO.,
Manufacturers of Fittings, Valves, Tools, and all styles of goods for Steam, Water and Gas. Wrought Iron Pipe, &c.
58 JOHN ST., NEW YORK. FACTORY AT BRIDGEPORT, CONN.

THE H. B. SMITH COMPANY

Patented April 9th, 1878. Successors to H. B. SMITH & CO. MANUFACTURERS OF



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For high and low pressure steam.
THE UNION STEAM & WATER HEATING APPARATUS,
For Warming and Ventilating Public Buildings and Private Residences.
Gold's Pin Indirect Radiators.
Also Manufacturers of
Smith's Combination Pipe Vise,
(DART'S PATENT,) and
BRECKENRIDGE'S PAT. AIR VALVES.
MILLS' SECTIONAL SAFETY BOILERS.
FOUNDRY: WESTFIELD, MASS. A. MERCER,
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(Successors to WYLLYS H. WARNER,)
STEAM WARMING APPARATUS,
HIGH AND LOW PRESSURE.
BOILERS, RADIATORS, AUTOMATIC WATER FEEDERS, DRAFT REGULATORS, Etc.
Sole Manufacturers of the
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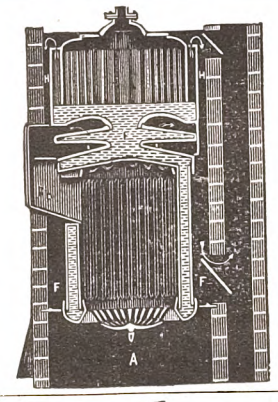
No. 114 LEONARD STREET, NEW YORK.
Also, 59 West Water Street, Syracuse; 310 Broadway, Albany.
☞ *Estimates furnished on application.* ☜



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Makers and Designers of Steam and Water Heating Apparatus for Public and Private Buildings.
Agents for THE PAGE STEAM HEATER, for House Heating.
Simple in Construction. Accessible for Cleaning. Economical in Fuel.
New England Agents for
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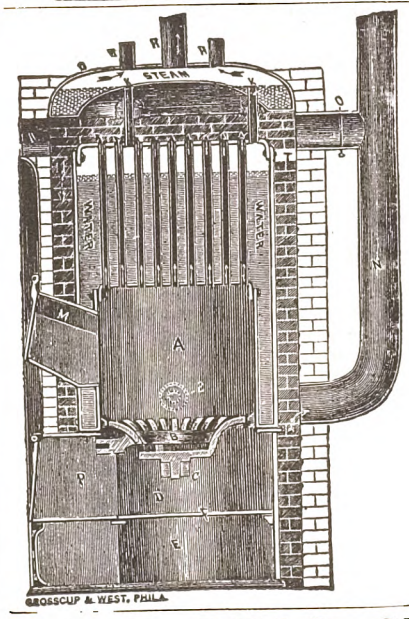

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A PERFECT SUCCESS BY OUR APPARATUS.
24 *SIZES, LOW PRESSURE GENERATORS.*
Prettiest Direct Radiation.
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LIGHT'S PATENTS the most popular with the trade.
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Our sales from year to year have doubled, with good satisfaction everywhere.
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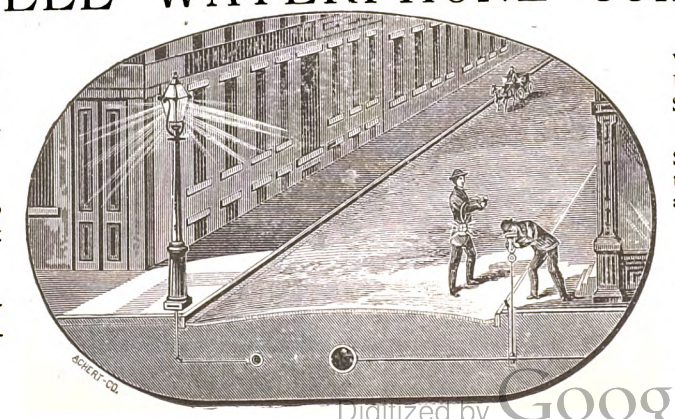
Sole Proprietors of the Patent System for Waste Water Prevention.

The Simplest, Cheapest and Most Efficient Method.

Requires no Preparation Where Outside Stops Exist.



Sole owners of the Wire Connection, to be Used Where Outside Stops Are Not Found.

The Waterphone is Specially Adapted for the Uses of Plumbers and Machinists.

Address,
Thos. J. Bell,
Manager,
CINCINNATI, OHIO.

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NEARLY three years ago the undersigned introduced to the trade in this country THE ROYAL PORCELAIN BATH.

Prior to that period it was little known, except to those Americans who may have seen them when traveling in Great Britain; while it is true that they had been used there for 25 years, and were universally conceded to be the finest thing in the way of a Bath Tub known, yet, like all things supposed to be new and of high cost, they required extensive advertising to secure their acceptance and use to any considerable extent in the United States.

The effect of numerous expressions of opinion, made without either knowledge or experience to justify them as to their durability and utility, had to be counteracted, yet, as a result, we have succeeded in having them selected for some of the most elegant residences that have been erected within the past ten years. They have also been used in several hospitals, for which places we make a special, less elaborate, and cheaper class of fittings.

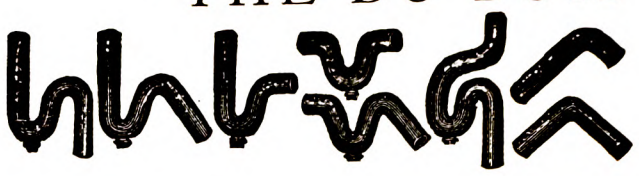
A personal inspection will convince any one of their superiority. Their increased cost over that of an ordinary copper-lined bath tub should not be a consideration to those who can afford to live in a house worth over $15,000, and would not be if their cleanliness, inviting appearance and durability was appreciated.

MEYER, SNIFFEN & CO.

46 & 48 Cliff Street,
New York.

N. B.—We have imported a line of sinks, which are made of the same non-absorbent material as the ROYAL PORCELAIN BATH TUBS. They are admirable for Hospitals. They have been used in some of our elegant New York residences, where their expense was no objection. They are one and one-half inches thick, and are less likely to be broken than cast iron. We have a size in stock that would make an admirable "Foot Bath."

"THE DU BOIS" TRAPS.

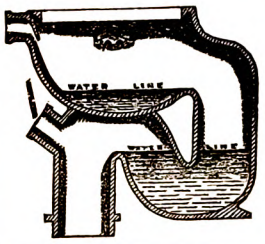


These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

For sale by all dealers in Plumbers' Supplies.

The "National" Patent Side Outlet Closet and Trap.

WITH IMPROVED FLUSH. (Registered).



Made either complete in one piece of Earthenware, or in two pieces with Basin and Trap separate

An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin.

The Most Cleanly, Durable, Effective and Cheapest Closet and Trap ever used, requires no fittings nor Machinery of any kind, and cannot get out of order.

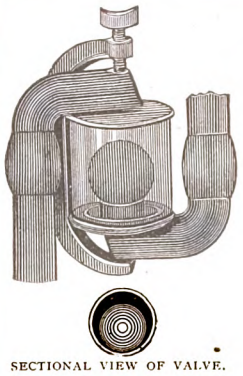
For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

MANUFACTURED BY THOS. TWYFORD, HANLEY, STAFFORDSHIRE, ENG.

Sole Agent for the Manufacturer, E. ASPINALL, 206 Pearl Street, New York.

PLUMBERS' AND SANITARY EARTHENWARE OF ALL DESCRIPTIONS.

Illustrated Catalogue and Prices Furnished the Trade on Application.



SECTIONAL VIEW OF VALVE.

BENNOR

Syphon Trap

Will recommend itself to

Architects, Plumbers and Sanitary Engineers.

Because; First—It is a perfect seal under all circumstances, with or without water.

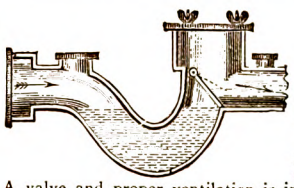
Second—By the peculiar construction of the valve in connection with its syphoning force, the trap and adjoining pipes are kept clean and free of coating

Third—It cannot become clogged.

Fourth—It is simple, durable, cheap and easily adjusted.

BENNOR SYPHON TRAP CO., LIMITED.

17 North 9th St., Philadelphia, Pa.



BEDELL'S

IMPROVED

IRON SEWER GAS

AND

BACK WATER TRAP

Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.

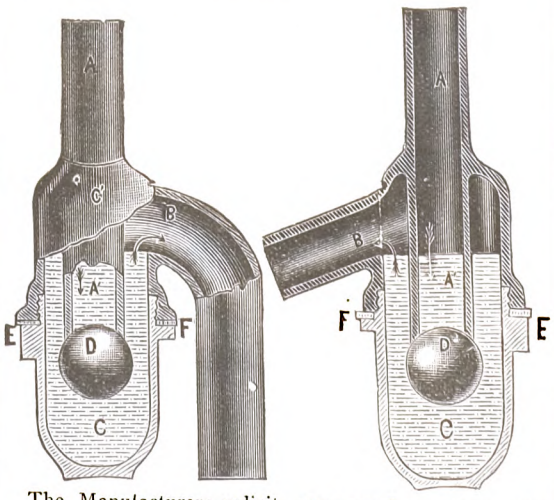
THE BOWER

SEWER GAS TRAP.

A Positive Valve Seal. A Sound Water Seal.

Simple, Cheap, Effective and Durable.

Under the severest tests to which a trap could be subjected by a commission appointed by the National Board of Health, and whose report was printed in full in THE SANITARY ENGINEER, it will be seen that the BOWER TRAP offered greater resistance to syphonage action than any trap manufactured for sale.



The Manufacturers solicit correspondence from the public, especially the Trade and Architects.

Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

B. P. BOWER & CO., Manufacturers, Cleveland, O.

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With Reference to

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Adopted by the Uppingham Sanitary Authority and allowed by the Local Government Board

WITH EXPLANATIONS AND SUGGESTIONS.

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HAYWARD & HUTCHINSON, 317 *Ninth St., n.w.*, give special attention to *Modernizing defective plumbing* in city residences, and, having a large force of competent workmen, attend promptly to all jobbing orders.

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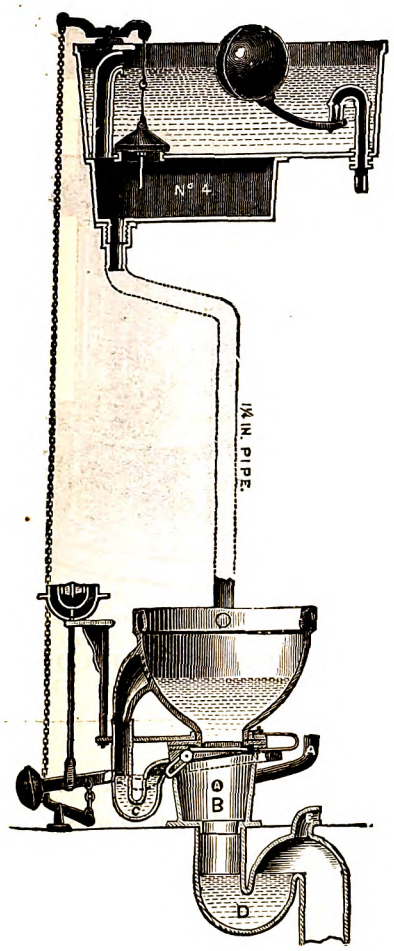
No. 1

WATER-CLOSET APPARATUS

CONSISTS OF A

HELLYER WATER-CLOSET,

With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



The names of some of the parties using them and those having them for sale with full descriptive circulars, will be mailed on application to us.

MEYER, SNIFFIN & CO.'S No. 3 A

WATER-CLOSET APPARATUS

CONSISTS OF A

HELLYER'S *ARTISAN HOPPER,*

WITH IMPROVED FLUSHING RIM.

FLUSHED FROM OUR

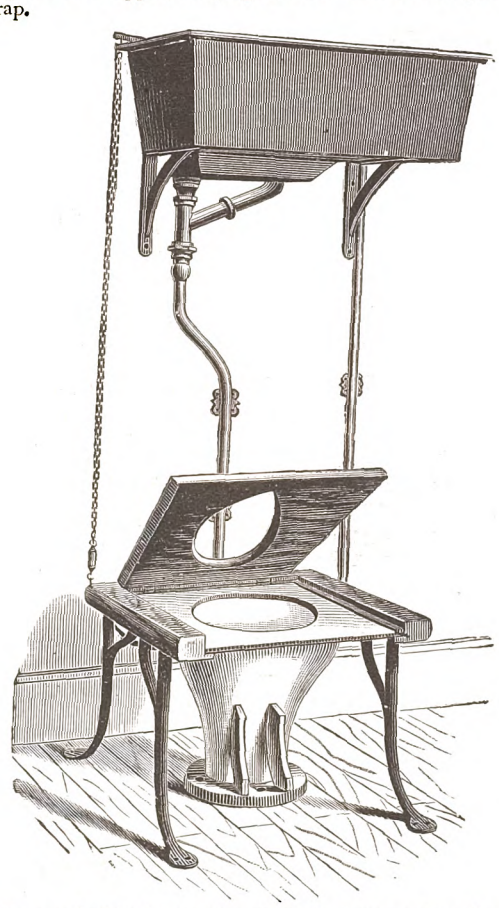
No. 2 A Preliminary Flush Cistern.

PATENTED.

Complete with seat, and all attachments ready for putting up, except lead pipe.

This is an admirable arrangement for Stores, Tenement Houses, Servants' Use, or any public place, where people neglect to lift the handle or properly flush an ordinary Water Closet.

This Hopper is of Earthenware, of novel shape, and with improved flushing rim, when supplied and fitted up as shown herein, always clean. When seat is depressed, a valve is raised, and Service Box filled with water, to extent of two and a half gallons. When seat is relieved of weight, the valve before referred to is closed, another one opened, when the contents are suddenly delivered through an 1¼ pipe to the Hopper, carrying all solid matter through the trap.



By a valuable improvement in the construction of our No. 2 Cistern—which is patented—a preliminary flush of half a gallon is secured, which thoroughly wets the entire inner surface of the hopper. The trickle is dispensed with, thus economizing the use of water, and very much better results are secured.

In ordering, describe as "*Meyer, Sniffin & Co.'s No. 3 A Water Closet Apparatus.*"

These Hellyer Hoppers are sold with various flushing apparatus, their efficiency largely depending on the selection. It is for this reason that we never sell the Hoppers unless we are satisfied that the flushing arrangements are suited for the particular duty required.

Creque, Ronalds & Co.

54 CLIFF STREET, N. Y

Manufacturers of

COPPER BOILERS,

With or without CREQUE'S PATENT CIRCULATION.

Foot and Seat Tubs,
Closet Pans,
Air Chambers,
Pantry Sinks,
Copper Balls,

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SHEET COPPER.

Every Pattern, Size, Weight and Quality of

COPPER, ZINC AND NICKEL PLATED

BATH TUBS.

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IRON RANGE BOILERS,

WITH OR WITHOUT

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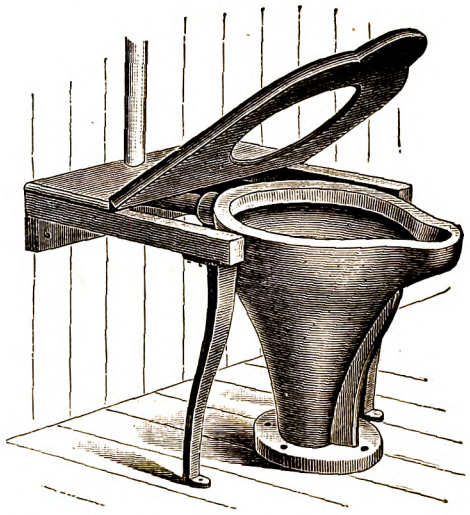
MADDOCK'S

DELUGE HOPPER,



WATER CLOSET and LIP URINAL

COMBINED,

WITH FLUSHING RIM.

Designed for Hotels, Factories, Stores, Public Buildings, Tenement Houses, Hospitals, Railroad Depots, &c.

Can be seen in operation at our New York Warerooms.

Thomas Maddock & Sons,

MANUFACTURERS OF

Sanitary Specialties in Earthenware,

Besides all the staple wares for Plumbers' use.

All our goods guaranteed Equal to the Best Imported Ware,

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MEYER, SNIFFEN & CO.,

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Full Descriptive Circulars sent on application.

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AND

FITTINGS

A Specialty by

ALFRED BRADY,

Iron Founder.

Foundries: West 55th Street, bet. 10th & 11th Ave.

Salesrooms: 141 Spring Street, and 1481 & 1483 Broadway,

NEW YORK.

Send for Catalogue and Price Lists

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General Agents, and Sole Manufacturers for the West, of

JENNINGS'

Patent Water Closets

The Original and most Reliable SANITARY WATER CLOSET in the World.

200 Vine Street, Cincinnati, O.

☞ *GET THE BEST!* ☜

E. Stebbins M'f'g Co.,

SOLE MANUFACTURERS.

STEBBINS & BRIGHTWOOD

PLUMBERS' BRASS WORK.

BRIGHTWOOD, MASS.

HENRY STEEGER & CO.,

Established 1852.

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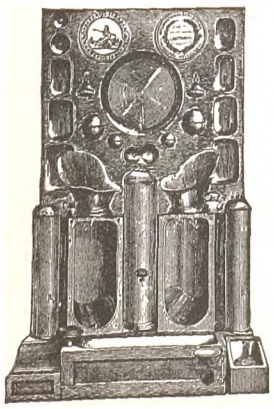

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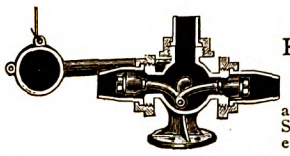

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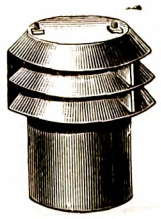

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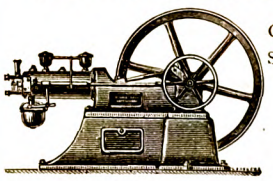

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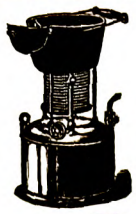

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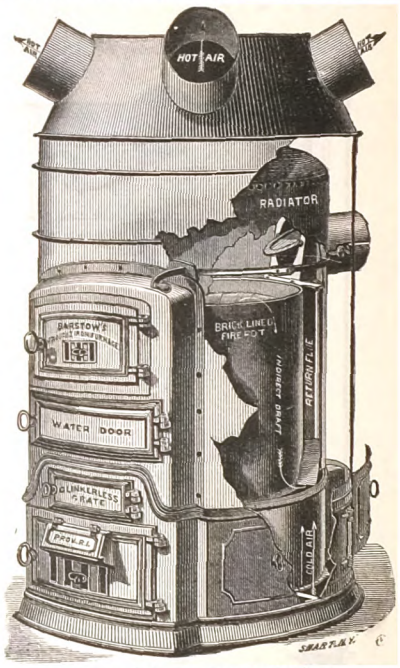

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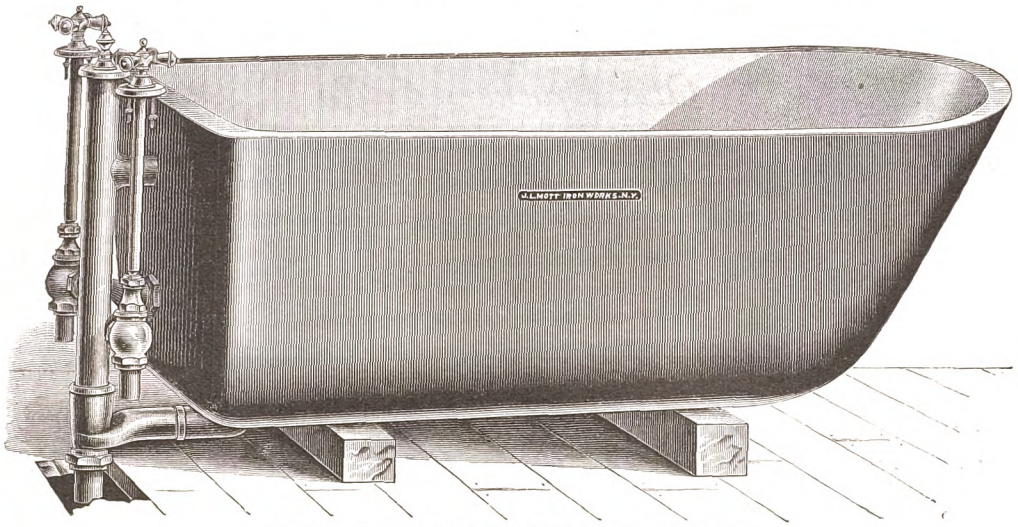

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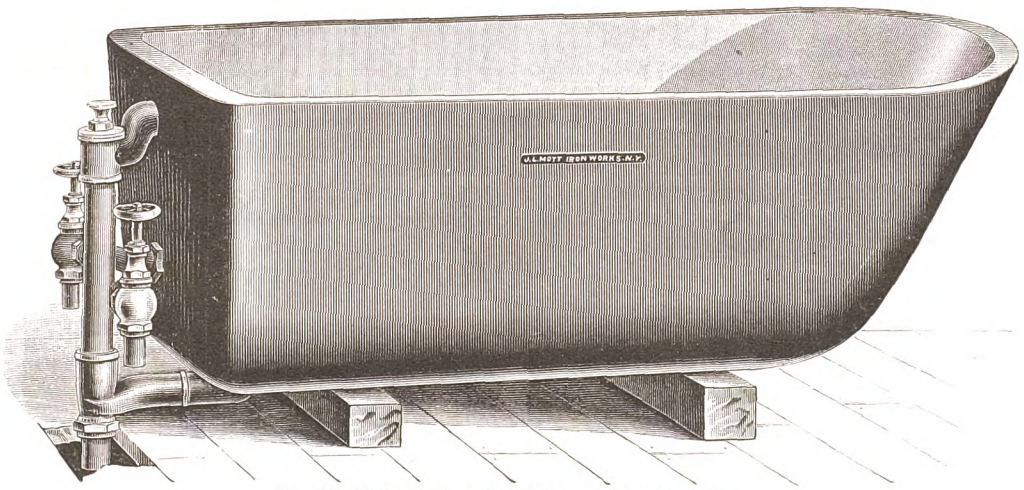

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INTER-STATE RELATIONS OF WATER SUPPLY.

The Connecticut Legislature has before it a bill to create a joint commission selected from the State Board of Agriculture, the State Board of Health and the State Fish Commission to investigate the subject of the pollution of streams in the State, and to experiment upon the utilization for agricultural or other purposes of the excreta and refuse of manufacturing processes which at present are polluting the streams. The matter is one of great and increasing importance, and this city and State are deeply interested in whatever action may be taken with regard to it by the State of Connecticut; since the tributaries of the Croton lie in that State.

The general principles of the common law with regard to the pollution of streams, as laid down in various decisions of the courts, may be summed up as follows.

There is no special property in or ownership of *running* water. The owner of the soil over which it runs has certain rights with regard to the use of it, but these rights do not depend upon any ownership of the water itself. Every one has a right to have the air and water which comes over his land to come there with their natural purity and in their usual volume except in so far as these may be impaired by a reasonable use for the usual and ordinary purposes of life by those over whose premises this air and water have previously passed. On the other hand every one over whose land water flows has certain usufructuary interests in it, which interests pass with the soil, and to that extent may be considered as property which may be sold or leased.

"Thus one person may be the owner of the soil over which a stream flows and yet have no interest in the water which flows there; or he may have a partial interest therein according to the terms or conditions of the grant by which he holds the soil. It is not water itself which thus becomes the subject of bargain and sale, for no man owns that, and consequently no man can sell it, but it is the beneficial use to which it may be applied by the owner of the land while passing over the soil that becomes the subject of traffic."*

The owner of the bed of a stream is the one who owns the banks. If he owns but one bank he owns the bed of the stream to the centre, no matter whether this stream be wide or narrow. He has the right to use this water for the support of life in man or beast, which is called a *primary* right, and also to use it for manufacturing purposes, which is a secondary right, and if the stream only furnishes enough water for the *primary* rights of those upon its banks, no one has the right to use any of it for the *secondary* purposes. No one has the right to diminish the quantity of the water which will, according to the natural current, flow to a proprietor below, except for the primary purposes just referred to, nor can he throw the water back upon the proprietor above.

No one has a right to put into a stream anything which can work detriment to other persons residing on the stream or using the water. The questions to be determined in each case are, first, the fact of the pollution of a stream with matters which cause discomfort or danger to others having the right to use the water, and second, what constitutes a reasonable use.

In addition to the common law many States have statutes relating directly or indirectly to the pollution of running streams. For example, Connecticut forbids, under penalty of one hundred dollars for each offence, allowing any substance deleterious to fish to flow or drain into or be placed in any waters having fish therein. Such a statute cannot, of course, be literally enforced.

But when it comes to a question between the rights of citizens of the State of New York to have the water of the Croton and Byrum rivers delivered to them from the State of Connecticut pure and free from anything that can harm them, no statute law is applicable, and in case of infringement of these rights, it would only be possible to bring the complaint before the United States Courts under the provisions of the common law.

The investigations proposed by the commission above referred to will probably amount to very little—no doubt they can make a readable report condensed from the reports of the extensive investigations which have been made by the English government on this subject—but to make any real substantial addition to our knowledge on this subject will require the employment of skilled chemists, etc., who can give their entire time to the subject, and who will not begin to be useful in less than four or five years. It is a matter for the general government to undertake, and not for any single State, the principle being precisely the same as that which we have urged as applying to preparing standards for the adulteration of food, viz., when information is needed which is for the benefit of the whole country, it should be obtained under the direction and at the expense of the United States.

* Wood on the Law of Nuisances, 1875, p. 309.

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A TENANT'S RIGHTS.

A case has recently been decided in Chicago which is of interest from a sanitary point of view.

A tenant in an apartment house suffered from defective plumbing, leakages, and sewer gas, and notwithstanding his frequent requests that the proper and necessary repairs be made, the landlord neglected and refused to make them.

The tenant then, still remaining in possession, refused to pay his rent, whereupon the landlord brought suit.

In delivering its opinion the Court said it had not the slighest doubt that the building was wholly unfit for human beings to live in, and it was the necessary result of landlords desiring to build their houses in as cheap a manner as possible; yet, nevertheless, so long as the tenant remained in possession of the premises he must pay the rent, and if so disposed might sue the landlord for damages, or he could vacate the premises, surrender his lease and relieve himself from further liability for rent.

This decision does not conflict with the principle laid down by the Court of Appeals in this State in the case of Cesar *vs.* Karutz which we have already commented upon. In the latter case the defendant did not refuse to pay rent; but as suggested by the Chicago Court sued her landlord for damages on the grouud that he had knowingly rented her rooms in his house which were infected with small-pox, in consequence of which she was taken ill of the same disease. The jury under instructions rendered a verdict in her favor for $1,500 and the Court of Appeals sustained the verdict.

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THE SUPPRESSION OF WASTE.

(Continued from page 314.)

Considerable pains are taken in the examination of water closet cisterns, and in this respect the standard required in Liverpool is higher than anywhere else we know of. A specification was prepared, giving the most minute details for the information of manufacturers, and this must be strictly conformed to, it being held, and very properly, too, that if not accurately made, these appliances are waste preventers in name only, and on this account we have taken the ground that unless the waste preventing cisterns contemplated to come within the minimum tax fixed by the Department of Public Works are carefully examined and tested, they will fail to secure the results aimed at; indeed, for that matter, without careful inspection and good management the whole movement, which is susceptible of doing a great good, will prove disappointing.

The various patent so-called waste-preventing valves are not allowed. Prior to 1873 single cisterns were used with one valve, and so arranged that the ball cock was held up when the valve was lifted. These were so poorly made that they proved unreliable, and they were first opposed because they were provided with a ground key ball cock, it not being considered practicable to adjust levers with a ball cock that came to a dead stop, and as the ground key ball cocks were constantly leaking, this fact influenced the prohibition of the single cistern.

In each waste preventing or double valve cistern, there must be $\frac{3}{16}$ of an inch play after the valve is closed before it can be approved, and this is carefully looked after by the testing officer. The rules prescribe that the measuring compartment shall hold two gallons, which is ample for the hopper forms of water closets, but where special kinds of water closets are used that need a little more, special tanks are sanctioned so long as they are so constructed that there is a limit to the amount that can be drawn at one lifting of the valve. The main point sought after is to prevent a constant running of the water should any one fasten the handle up, a practice often resorted to by persons who have defective plumbing, and imagine that a trickling of water will "keep down the sewer gas."

It should be remembered that in Liverpool, as elsewhere, much opposition at first prevailed, but the water committee, which had the respect and esteem of the community, loyally stood by their engineers and gave the support that a public official everywhere needs when required to enforce what are at the moment unpopular measures, and nowhere is that support more needed than in a city like New York.

It is but justice to state that much of the credit of the success achieved in Liverpool was due to a Mr. Wilson, since deceased, who was indefatigable in his efforts to facilitate the methods of inspection, and to secure the adoption of the details essential to the proper enforcement of the necessary measures.

As in the other cities we have described, no fittings, or class of fittings, are selected that any firm has a monopoly of making—though it often happens that patents are procured on some detail, it is never on any *essential feature required by the authorities*—consequently the widest latitude is given to the purchaser, he being simply required to use articles that are well made, water-tight and capable of fulfilling the requirements of such devices. Whenever, therefore, the authorities in this country attempt to prescribe the character of fittings, they will find the domain covered by no patents sufficiently wide to secure what the public need, and what any manufacturer can make if he chooses to, at least, so far as plumbing fittings are concerned.

In 1881 we learned from Mr. Parry, the engineer then in charge of the distribution of water, that 122,673 houses were supplied with water by the corporation; the population was 725,000, being an average of 5.91 persons to each house. The average rate of consumption for all purposes was 23 Imperial gallons per head daily, which included five gallons per head for trade purposes measured by meter, about three gallons for sanitary purposes and miscellaneous trade uses, charged for by assessment, leaving about fifteen gallons per head daily for domestic purposes, stores, hotels, public buildings and all waste. Water closets are general in Liverpool, and each one is required to be so fitted that it can be flushed with two gallons in a few seconds; private baths are common, and of late years it has been the practice to put them in all new houses renting for more than $90 per year. There is a considerable demand for shipping, and public fountains are numerous. In order to sum up the results secured by the adoption of efficient measures to restrict waste we cannot do better than quote from Mr. Thomas Hawksley's address as President of the National Association for the Promotion of Social Science, delivered at Liverpool in October, 1876:

"Under the able management of Mr. Deacon (Borough Engineer) the supply has been changed with great advantage from a restricted intermittent to an unrestricted constant system, and as a consequence of the admirable method he has devised and adopted for the discovery, suppression and prevention of waste, the municipality has emerged, as respects the quantity of water at its disposal, from a state of actual poverty—poverty in the midst of plenty—to a condition of redundant wealth. It has enough and to spare."

"To provide a town with water of a suitable quality is now a matter of great difficulty and much expense. Competent and available sources are becoming fewer and fewer, and must in general be sought at distances always becoming more remote. Moreover, the value of land, labor and materials, is almost day by day advancing, and so rapidly and steadily, that the present cost of a reservoir is, as I know by repeated experiences, double what it was less than thirty years ago."

In view of these facts so forcibly stated, is it not stupid to clamor that "water should be free as air," and should it not be considered a crime to waste and deprive others of what they are entitled to?

[TO BE CONTINUED.]

FIRE IN A FLAT.

A fire in the Cambridge, an apartment house in the upper part of this city, early last Wednesday morning, spread with such rapidity that two of the inmates were unable to escape and were suffocated while descending a stairway. These flats are so prominent a feature in the building of this city that this fire has caused great excitement, in which there is not much surprise, for the fate of the Cambridge is what might reasonably be expected of 95 per cent. of those erected in this city. The only difference hitherto has been that they have not caught fire. Nothing but stringent laws will make these edifices reasonably fire-proof. If the well-to-do become alarmed and refuse to occupy them, a limited number will be built fire-proof to get such tenants as will pay. The great mass of people, however, will take their chances and consider location, finish, style and low price as an off-set for safety.

BAD PLUMBING IN A PUBLIC BUILDING.

Our exchanges have lately reported several instances where the condition of court rooms has become so bad that the judges have taken summary action to remedy the nuisance. One of the most aggravated cases was that of the Columbus, O., Court House, where Judge Bingham, of the Court of Common Pleas, ordered a report by a committe on the subject. They concluded that its sanitary condition is so bad as to be incapable of improvement. From details given in the *Ohio State Journal*, it appears that the court room received the foul air from a cellar once used for a jail, but in which at present the disused cells serve for the dumping ground of offal from the insane patients confined in apartments in the cellar. This offal was allowed to accumulate in the cells, and in addition an untrapped sewer connection allowed free entrance of sewer air.

We have noticed of late, a great deal of interest in plumbing matters on the part of ladies. A few months ago an elderly lady, with a house in the country, pooh-poohed certain protests which were made about the possible pollution of the water supply, using the time-worn argument of the health of a past generation, in proof of the foolishness of health agitation in this. Now, however, her tone has changed. Neither city house nor country house was altogether right. Plumbing is looked on with much respect and great interest. One of the most sensible, of the many sensible things which Mrs. Isabella Beecher Hooker said last summer at the Greenwood Lake conference, was the advice she gave to women about understanding the plumbing of their houses. She described her own practice of going over a job with the plumber until she understood every point of it, and her advice to others was to follow her example.

It is with deep regret that we have to announce the death of a member of our staff, Miss Alice Bogert, daughter of the late Horatio Bogert, Esq., which occurred on Thursday of last week at her home in Hackensack, N. J.

Miss Bogert had been connected with this journal since October last as an assistant in the editorial work, and quickly won the esteem of all who were witnesses of her thorough, faithful work. Such was her earnestness in her duties in this office, that though weakened by a recent illness, she persisted in daily coming in from Hackensack, until a few weeks ago her strength failed, and she was obliged to desist. Her illness was not thought dangerous until pneumonia set in, and she rapidly sank, her death being very sudden.

Miss Bogert had been for some years a contributor to rural and New York journals. Her funeral at Christ Church, Hackensack, on Monday, was largely attended by friends of her family and herself from this city as well as from the neighborhood.

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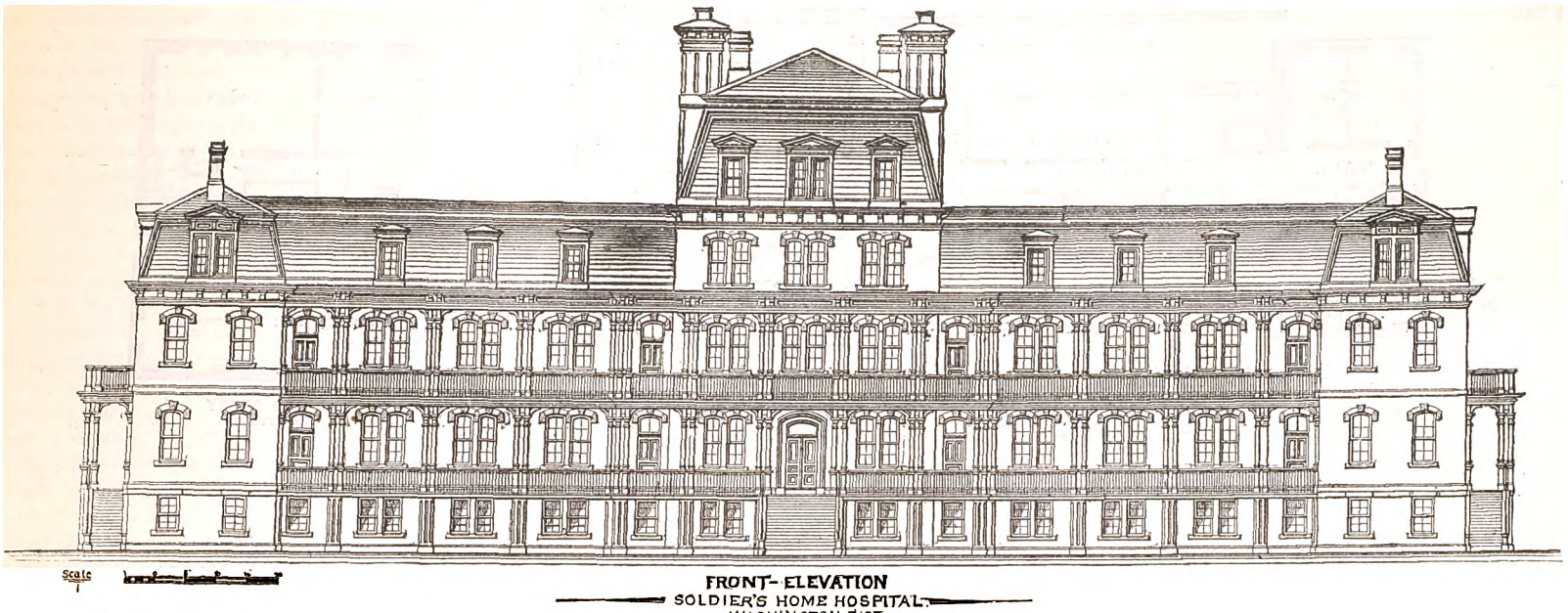
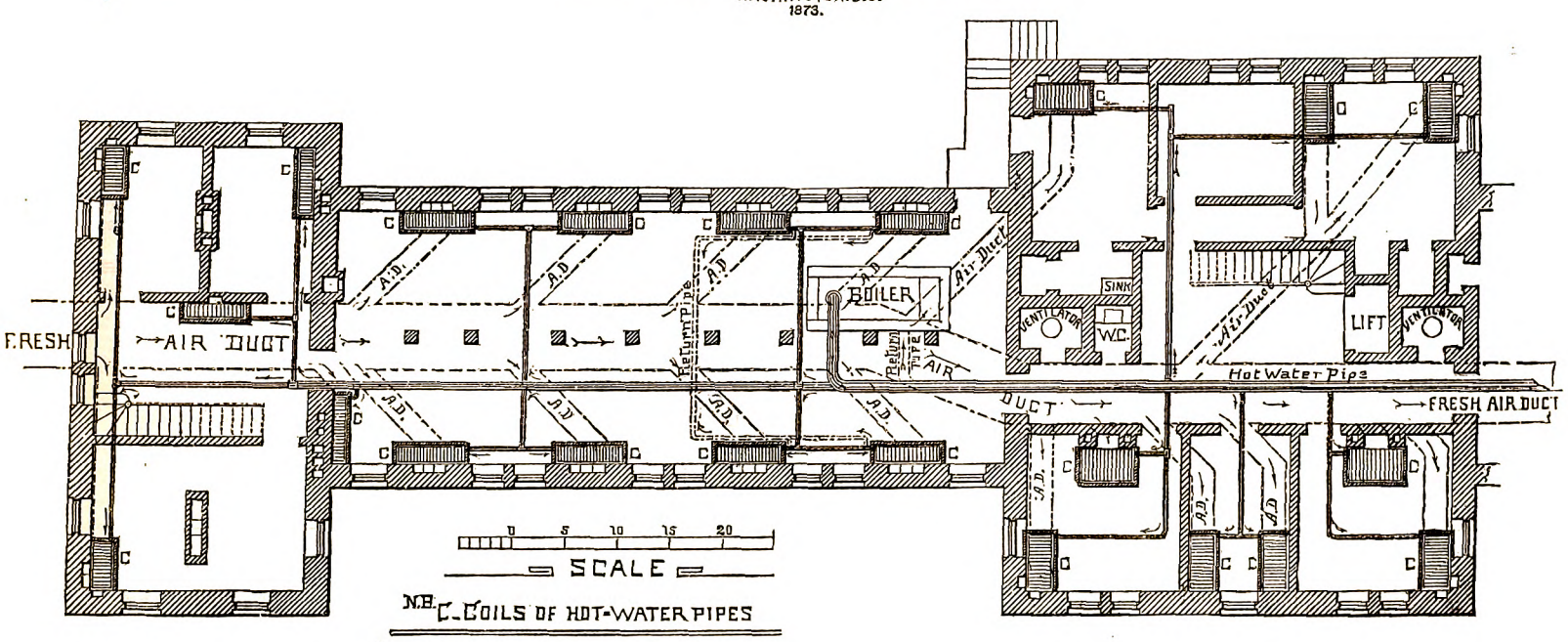


FRONT-ELEVATION
SOLDIER'S HOME HOSPITAL
WASHINGTON, D.C.
1873.



PLAN OF BASEMENT
WITH FRESH-AIR DUCTS AND HEATING APPARATUS

LETTERS TO A YOUNG ARCHITECT.

ON

VENTILATION AND HEATING.

BY JOHN S. BILLINGS, SURGEON, U. S. A.

No. XLIV.

Since the publication of my remarks upon Dr. Burdon Sanderson's plan for a small-pox hospital I have received a letter from E. A. Jackson, of New York, calling altention to the fact that if the air be introduced in the inner circle, as I suggested, the outer parts of the room would not be warmed. The objection as regards a hospital in this climate is well taken, for although I was careful not to say that all the fresh warm air should be thus introduced, but only the greater part of it, it is nevertheless true that my criticisms were based entirely on the supposition that the hospital would be located in London. Where, as in the greater part of this country, provision must be made for temperatures at least as low as zero F., it is always desirable on the score of economy as well as for satisfactory heating to arrange the flues so that the foul air shall be taken from points in or near the floor of the room.

Of all small hospitals in this country with which I am acquainted, the one in which the heating and ventilation has been most thoroughly proved to be satisfactory, is the Barnes Hospital at the Old Soldier's Home near Washington, the general arrangement of which is shown in the accompanying illustrations.

This hospital is built of brick, and consists of a central administration building measuring 52x55 feet, two pavilion wings each 64x29 feet, and two end towers each 24x46 feet. The central building has a basement, three stories and mansard roof, the rest of the structure two stories, with basement and mansard.

The total amount of cubic space to be heated is about 310,000 cubic feet. The basement is occupied by the heating apparatus, which is hot water, and consists of two tubular boilers, each nine feet long and 42 inches in diameter, with mains, pipes and coils. The heating coils are of cast iron pipe three inches in diameter and are placed in fresh air chambers in the basement as shown in the plan.

At the point of entrance of the supply pipe to each coil is a valve by which the flow of hot water may be diminished to any degree and the temperature of the coil regulated accordingly.

The fresh air flues are of terra cotta pipe built into the walls and opening into the space above the heating coils.

The apparatus has maintained an uniform temperature of about 70° F. in the coldest weather, and the temperature can be varied at the different registers to suit the feelings of patients near them.

From May to September the doors and windows are usually open and for the most part the natural ventilation thus secured is sufficient, but on some hot, close days and nights in this period, when there is no wind, it becomes desirable to use special means to secure ventilation, and this is done by either aspiration or the use of the fan, or by a combination of the two.

When the natural ventilation by open windows is insufficient or impracticable, fresh air is supplied by a shaft eight feet in diameter and 38 feet high, placed 74 feet west of the building. This shaft is connected with a brick air duct 286 feet long which passes beneath the basement through its entire length and gives off branches leading to the air chambers containing the heating coils.

At the point of junction of the vertical shaft with the fresh air duct is located the fan, which is eight feet in diameter and has 24 blades, each 12 inches wide.

The motive power for this fan is furnished by a six-horse power engine, and the amount of coal required to run it is about 140 pounds for 24 hours. The fan is usually run at 60 revolutions per minute, giving a velocity in the air duct of from four to six hundred feet per minute, the cross section of the duct at its throat being 40 feet square. The removal of foul air by aspiration is effected by two chimneys in the administration building. Each chimney measures four feet four inches by five feet eight inches, and is 96 feet high.

A boiler iron flue two feet in diameter is placed in the centre of each chimney, extending from the basement to a height of three feet above the chimney cap; into these flues pass all the products of combustion from the hot water and steam boiler furnaces, as well as those from the kitchen range. Each flue has a basket grate at

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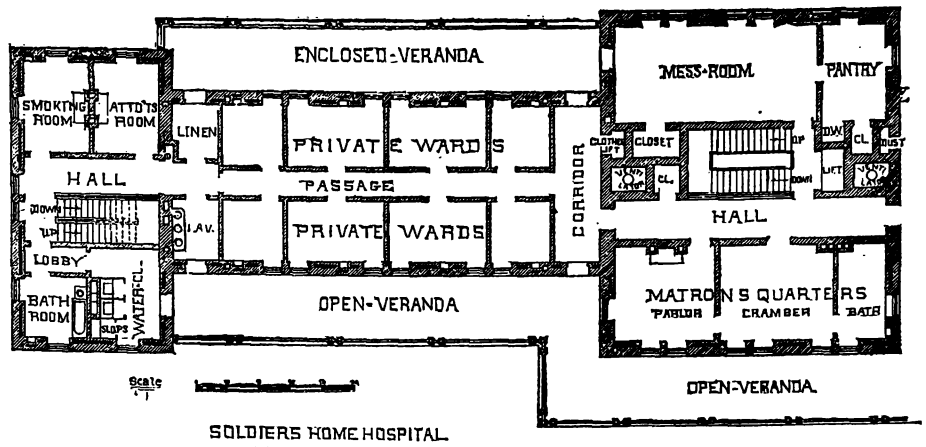
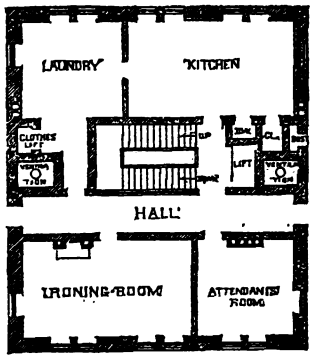
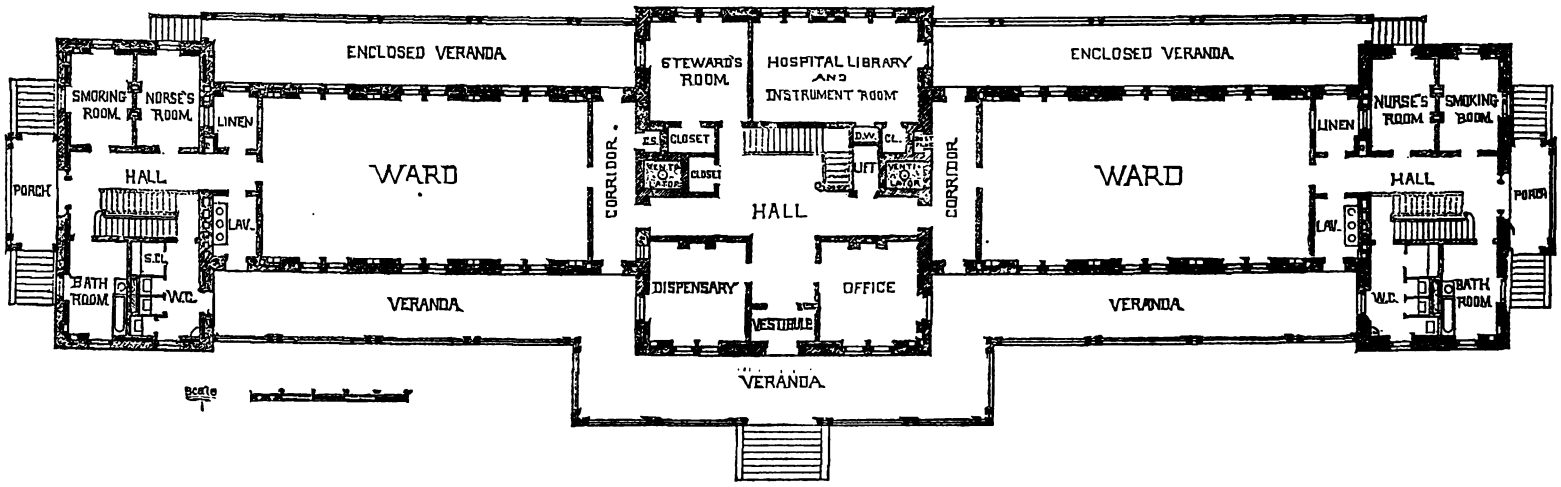


SOLDIERS HOME HOSPITAL
WASHINGTON D.C.
1873

SECOND STORY



THIRD STORY
MAIN BUILDING



HOSPITAL
AT
SOLDIERS-HOME
WASHINGTON.D.C.
1873

its base in which a fire can be built when the furnaces are not acting.

Into the chimney shafts outside these flues empty the foul air ducts from the wards. These ducts are three feet three inches wide, one foot deep and 50 feet long, and are placed above and below the centre of each ward with which they communicate by accurately closing registers placed in the centre of the floor and ceiling. These foul air boxes are lined with tin and are cleaned daily.

Each ward contains 12 beds, is 50x24x15 feet, and has five foul air registers along the centre line of the floor and five in the ceiling.

Each of the upper registers has a clear area of 1.33 square feet of opening, and each lower register 1.5 square feet of clear opening. Each lower ward has 16 fresh air inlets, eight being ten inches above the floor, and eight ten inches below the ceiling; in the upper wards the upper registers are omitted. Each fresh air register has a clear area of one square foot.

The double set of inlets in the lower wards was arranged for experimental purposes to test the value of General Morin's theory that the warm air should be introduced at the ceiling. It was found that when this was done there was a difference of 10° in temperature between the floor and the ceiling and that the patients complained of cold feet and discomfort. It is also evident that when the warm air is introduced near the ceiling it is impossible to vary the temperature at different beds, a thing which it is often desirable to accomplish in a hospital.

The mean velocity of the upward current of air in the aspirating chimneys is about 180 feet per minute. With good fires in the grates at the base of the flues the highest recorded velocity was 700 feet per minute.

Each chimney under ordinary circumstances removes from the two wards connected with it about 36 cubic feet of air per second, or one and a half cubic foot per second per man.

This supply can be at any time doubled by the use of the fan. When fires are used at the base of the chimneys to accelerate the aspiration the consumption of coal is about 30 pounds of anthracite per hour per grate.

In my next letter will be given the results of observations made on the ventilation of this hospital by Surgeon D. L. Huntington, U. S. Army, from whose paper on this subject, prepared at my request, the above description has been condensed, and to whom I am indebted for very careful and valuable observations on the working of the apparatus.

(TO BE CONTINUED.)

THE CARE OF FIXTURES.

Our readers have been frequently advised as to the proper care of plumbing fixtures. The following hints from the *American Engineer* are well stated and worth repeating:

The most troublesome of all is the ordinary house sink, into which the bulk of the greasy water from dish washing is emptied. Contained in the hot water, the grease is dumped into the sink and out at the drain. Being chilled, however, in its contact with the cold metal of the sink or drain, it is at once deposited about the strainer and proximate waste pipes, the greater portion being deposited on the inner surface of the traps, where it remains to decompose. Here something more than water is necessary, and when, as with the modern flat or tenement, the sink is made the receptacle of the suds on wash days, the drain is kept moderately and sometimes perfectly clean by reason of the various washing sodas now in use. Though the grease has been deposited by means of hot water, it is not safe to expect that hot water alone will remove it, since it was the chilling of the hot greasy water that first deposited the refuse grease. There are special fixtures for catching this greasy deposit at various points along the drain, but the better way is to eradicate the objectionable and carry it off altogether.

Where the sink is used for kitchen purposes alone, and there are no weekly flushings from the wash tub, it is necessary to take pains to remove the grease by special means, introducing into the dish water some one of the sodas or ammonia. The tubs, whether in the laundry or bath-room, require moderate, though timely attention. In the case of the laundry tubs, the deposit of soft mud, left from clothes washing, is partially deposited at the lowest portions of the tubs, or sticks to the corners or joints, and if, as is often the case with what are called stationary tubs, a quantity of water is left in and the lids shut down, decomposition soon sets in, and an odor far more offensive than the sewer gas is experienced on lifting the lid or stirring the water. The tubs have to be thoroughly washed and flushed before the odor is thoroughly removed.

The application of disinfectants is of no use, cleansing must be resorted to. So, too, with the bath tub, a similar deposit is left from the water either at the bottom of the tub or in the drain, or more especially in the trap.

All this trouble from the tubs can be prevented by proper care and cleanliness after use. They should be thoroughly washed and flushed after each service.

With urinals another special method of cleanliness is necessary, for while there are no greasy deposits, such as already described, there is, owing to the very rapid decomposition that sets in, a special demand for immediate flushing after use, or they will shortly become most offensive. Constructed of a proper non-absorbent, non-porous and non-corrosive material, a liberal flushing immediately after use will be sufficient, unless contained in a close and warm room. If the room is not properly ventilated, it is next to impossible, even with a most liberal flushing, to prevent an unpleasant as well as an unhealthy odor arising.

The more complicated utensil, and forsooth the most offensive one, if not kept clean, is the water closet. It is the one upon which an attempt at false economy must not be permitted. It is the one upon which the most thought and care must be exercised in its construction and location. It is the one whose parts, as at present constructed, are least attainable for cleaning purposes. In it the parts are mostly, of necessity, constructed so that they hinder a free and unimpeded discharge of the refuse matter. Hence the necessity that these parts should be flushed, and if possible, thoroughly washed at short intervals.

The "big brown bear" of the following must have thought himself a tenent of an upper flat in a New York apartment house. "A big brown bear at the Black Hills found and ate a bushel of salt with great gusto. An hour later he was seen at the bank of a creek, assiduously drinking, and occasionally raising his head to look up stream and see if the supply of water was likely to hold out."—*N. O. Picayune.*

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GERMS AND EPIDEMICS.*

In these days of the diffusion of knowledge; which is sometimes spread not only wide but thin; everyone is more or less familiar with the phrases "disease germs," "the germs of small-pox," "the malarial germ," etc., although some who speak of these in quite a familiar and patronizing way might, perhaps, find it rather difficult to state clearly the conception which they have as to the nature of these so-called germs, or as to the manner in which they produce disease. Very possibly, indeed, some may be inclined to consider these germs as being rather imaginary entities than actually observed things, an ingenious hypothesis rather than a demonstrated fact. It is the object of this lecture to state what we really do know at the present time about this subject, and to indicate the bearings of this knowledge in relation to epidemics.

That certain prevalent diseases are due to the entrance of minute living organisms from the air or water into the lungs or stomach, whence they work their way into the blood, is a very old idea. For example, Terentius Varro, a Latin author of the first century before Christ, says in his work "De re rustica," that marshy places are to be avoided because in them there grow certain minute animals which cannot be perceived by the eye, and which being carried in the air enter the body through the mouth and nostrils and produce very serious diseases." Varro states this as if it were an old and familiar idea, and it is quoted approvingly by subsequent writers, but no attempt seems to have been made to give the theory with precision until after the introduction of the microscope and the publication of the discoveries of Leuwenhoek. You can, perhaps, imagine the astonishment and delight with which those who used the first microscopes peeped into the new and unexplored world which lay before them; and as what is seen through this instrument depends quite as much on the training of the eye at the upper end as on what is placed beneath it, it is not surprising that some remarkable discoveries were announced.

Father Athanasius Kircher, in his treatise on the Pest, published in 1659, says, that with his new "Smicroscope" could be seen the extremely minute worms which cause the pest, and the writers in the next century made some similar announcements, but the theory was not fully formulated until after the cholera epidemics of 1832 and 1848, when it was urged by Dr. Cowdell that this disease was due to a minute fungus which inhabits the rice plant in India. Dr. Mitchell, of Philadelphia, taught in 1844-46 that malarious and epidemic fevers were due to minute fungi, and his essay is even to-day highly suggestive and interesting. The demonstration by Pasteur that various forms of fermentation and putrefaction of organic matter are due to vegetable organisms first put the matter on a scientific basis, and within the last ten years the germ theory of disease has found many advocates.

To understand the present prevailing views it is necessary that we should know the meaning of certain terms much used in discussions on this subject, and often used in a very confused way, since the words bacteria, germs, microzymes, etc., are not only used by different authors, but by the same author at different times, in different senses. In the first place we want some word to designate the great variety of particles which we find throughout all air and water under ordinary circumstances, and which are almost invariably present in decomposing organic matter—minute bodies, most of which are perceptible only with the best microscopes, and which present the most characteristic phenomena of life. These we will call microdemes, or little living things, and under this term are included the microphytes, or little vegetable organisms, the microzoa or minute animals, the microzymes or little ferments, the microbes or microbia of Pasteur, meaning literally, little lives, the bacteria, etc. Mingled with these microdemes there are usually other minute particles which are not living, and which may be either organic or inorganic. It is often extremely difficult, and sometimes impossible, to distinguish these from the microdemes, but usually the latter may be known by the uniform size and minuteness of the granules, their independent motion, and by signs of growth and reproductive division as shown by their being found in pairs or chains. The minutest spherical forms of these microdemes are called micrococcus or little grains, and when these are joined to form a chain they are called streptococcus or arthroccus. The short cylinders or rods are called bacteria, a term which is often improperly used to include the whole class. The microphytes, properly so called, are classed between the algæ and the fungi forming what Professor De Bary calls the Schizomycetes and Naegeli the "Spaltpilze."

At present it is not believed that these microdemes are ever spontaneously generated, or arise from any source other than living organisms. There is no proof that the microphytes which cause the various forms of fermentation, or putrefaction, develop into the higher forms of fungi, such as the common moulds; but this is not yet a settled question, and some careful observers believe that at all events certain common moulds may act as ferments. Since decomposing organic matters vary greatly in composition, and give very different products, while the microdemes which they contain also vary slightly in size and mode of grouping, it is a question whether the different results depend on a difference in the microdemes or a difference in the matter on which they are nourished.

The prevailing opinion at present is that there are many kinds of microphytes, each having special powers, and that each can only propagate its own kind within a certain limited time. But it also seems possible, that by changing the food of these organisms, and varying the temperature, the process of evolution and natural selection to fit them to their new surroundings goes on very rapidly, and that the result is the production of what might be called new species having very different habits and powers. But we must remember that all microdemes are not minute fungi, nor are they all germs. Using the words germ and organism in the ordinary sense, the germ theory is that certain diseases are due to the presence, and propagation in the system, of minute organisms which have no part or share in its normal economy. The word germ, however, is applied not only to independent organisms which originate outside the body, but also to living particles of protoplasm or cells forming, or which have formed, a part of the body itself, which are not microphytes, and can hardly be called independant organisms.

Let us now briefly consider some of the diseases produced by organisms foreign to the normal or healthy body. When these organisms are comparatively large and well known, the diseases which they produce are called parasitic. Of those which are thus produced by fungi, the best known are certain skin diseases, such as some varieties of ring-worm and the so called liver spots. One peculiar variety grows in the ear, another is sometimes found in the windpipe and lungs. These diseases are called mycoses, and are for the most part confined to the skin and mucous membranes, being those surfaces of the body which are either exposed to, or in free communication with the air. In other words, they are superficial affections, and the fungi do not appear to enter the blood, or to be generally distributed throughout the body. Even in that curious disease called mycetoma, or the fungus foot of India, where the comparatively large threads of a fungus penetrate the foot and ramify throughout its tissues, finally destroying them even to the bones, the disease is entirely local, being confined to the affected foot; and it appears to be necessary that there should be some wound or injury of the skin to permit the parasite to gain an entrance into the interior.

One of the most important of the diseases due to fungi of the nature of the common mould, is one which has for some time been known in cattle but was first observed in man about four years ago, the so-called actinomycosis. It occurs locally in the form of a tumor near the lower jaw, and also in a general or internal form, in which last case it is always fatal. The fungus seems to gain admission to the tissues usually through carious teeth, and gives rise to tumors and abscesses containing small yellow bodies, which are bundles of the threads of the fungus. Let us contrast with this a disease due to the presence of minute vegetable organisms in the blood, such as splenic fever, in which the fact that these organisms were the cause of the disease was first clearly made out. Splenic fever, also known as anthrax, contagious carbuncle, the black quarter, the Siberian plague, and malignant pustule, affects sheep, cows, and horses, and also man. In the blood of animals suffering from this affection, there are found large numbers of short straight, motionless rods or bacteria, about as long as the diameter of a blood corpuscle. These were discovered over twenty years ago, and it was known that blood containing them transmitted the disease with great certainty, provided it was fresh These rods, however, did not explain many of the peculiarities of splenic fever, the cause of which sometimes seems to adhere very tenaciously to certain limited localities, as, for instance, to a stable, or to one small field, where it would reappear after intervals of several years. It was found that the rods rapidly lost their vitality, and that the contagious properties of the blood containing them soon disappeared; and from this it was evident that if the contagion or cause of the disease depended on the bacteria, these must exist in some other form which was more permanent. Time passed on, and a German botanist, Professor Cohn, discovered that many of the bacteria have a stage of development in which they extend into long, slender rods, or threads, which he called bacilli, and that at regular intervals in these threads there developed extremely minute, highly refractive, spherical bodies, which were finally set free by the dissolution of the threads, and to which he gave the name of spores. Upon these characters he defined a genus of plants, which he called *bacillus*, and in view of the shape of the little rods in splenic fever blood, he ventured to predict that these would be found, under some circumstances then unknown, to develop into bacilli and produce spores, which spores would prove to be far more permanent in their vital properties than the bacteria. This prediction was verified by a series of careful culture experiments carried out by Prof. Koch. It was found that the little rods, when placed in various animal fluids suited to give them nutriment, and kept at a temperature near that of the human body, began to lengthen in a few hours, and very soon grew into slender threads, which were from twenty to an hundred times the length of the original rods. In a few hours more, minute dots began to appear in these threads and went on to form spores, which being set free, sank to the bottom of the vessel. Now these spores are found to retain their life very persistantly in spite of all manner of ill-treatment. They may be wetted and dried, buried in earth for an indefinite period, but even after many years, when they are placed in contact with a proper nutritive fluid and at the right temperature, they will germinate and elongate into rods precisely like the originals from whence they sprung, and after repeated cultures in this way, the results will still produce splenic fever, when inoculated in animals, so long as and no longer than they will produce fresh rods and spores in culture fluids. Baron Seebach, of Saxony, had suffered great losses from the repeated occurrence of splenic fever on his estate, and finally began to suspect that the disease was propagated from the graves of dead animals. He observed one day that the clover was growing with great luxuriance over a place in the corner of his fields where a sheep dying of the disease had been buried two years before. A few days later he noticed that some one had stolen the clover which grew at that corner, and the next day a woman, one of his tenants, came to him with great lamentation to tell him that her goat had just died and her cow was very ill. It was found that both the animals were affected with splenic fever, and the woman confessed that they had been fed with the stolen clover. In 1865 Baron Seebach was minister to Paris, and he then drew up a memorandum giving his views, which memorandum was placed by the French minister of agriculture in the hands of M. Pasteur. He reported after investigation, that if the carcass of an animal dying of anthrax be allowed to decompose at once with free access of air and moisture, its virulence is soon destroyed. The ordinary bacteria of putrefaction take possession and do their work, which in this case is a highly beneficient one and gives us a hint of how one species of micro-organisms may be used to drive out, destroy, or counteract the effects of others.

But if the carcass be so buried that but a limited supply of air comes to it, as in damp clay soil, the *bacillus anthracis* goes on to form its spores, and there the locality becomes a dangerous one. These spores, buried for years, may be brought to the surface by earth worms, and thence find access through food or water to other animals.

Pasteur proved to the satisfaction of a commission appointed by the Academy of Medicine of Paris, that the germs of this bacillus were present in earth over the grave of an infected animal buried twelve years before, and also in the casts deposited by earth worms in similar localities. Closely analogous to anthrax is the disease of hogs, known as the hog plague, which is also due to a bacillus which can be cultivated outside the living animal. The *bacillus anthracis* is to all appearance identical with a very common *bacillus*, the *bacillus subtilis*, which is found in all infusions

* A Saturday afternoon lecture delivered at the National Museum, Washington, D. C., Feb. 17, 1883, by John S. Billings, Surgeon U. S. Army.

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of dried grass or hay, the only apparent difference being that the bacteroid form of *bacillus anthracis* is motionless, while that of *bacillus subtilis* is very active. This *bacillus subtilis* is, so far as known, a perfectly harmless form, but a possible connection between the two forms was at once suspected, and after many experiments Dr. Buchner has announced that he can, by varying the methods of culture, transform the one into the other with great certainty. After carrying on the culture of the *bacillus anthracis* with free access of air for several hundred generations he found that it would no longer produce anthrax when inoculated, that it began to grow on the surface of the fluid, which is a characteristic of the hay bacillus, and finally that it would grow in an acid hay infusion which at the beginning of the cultures was fatal to it, in short, that it had become *bacillus subtilis*. The reverse process was more difficult; but by limiting the supply of air and gradually substituting animal for vegetable culture fluids he finally produced malignant anthrax germs from common sweet hay. His reported results are not yet accepted as conclusive however, and further and more careful experiments are needed to settle this question.

There occurs among fowls a disease which is commonly known as chicken cholera, not because its phenomena resemble those of cholera in man, but because it once prevailed in France at the same time as Asiatic cholera. The blood of fowls thus affected contains a microphyte which will grow and multiply in great abundance in chicken broth kept at a proper temperature. If a needle be dipped in broth containing this germ, and then dipped in other broth which has been sterilized by boiling, this last broth soon becomes turbid, and in a few days is swarming with the organisms. This process may be repeated a hundred times and a drop of the hundredth culture will produce the disease if inoculated as surely as would one from the first, nor will the disease thus produced be any the less virulent or fatal.

But if instead of making these successive inoculations while the fluids are still turbid, and the microphyte is flourishing, we wait from one to six months, the malignancy of the microphyte becomes greatly diminished, and when inoculated upon an animal it no longer produces fatal results and its effects seem at first to be confined to the production of some trifling local irritation. The virus has been, as Pasteur phrases it, attenuated. "The extraordinary and very important fact, if it is a fact, discovered by Pasteur, is that this tamed and attenuated microphyte does, nevertheless, produce a change in the whole system of the living animal, which is no longer susceptible to injection by subsequent exposure to the influence of the unattenuated germs." In other words, this attenuated virus acts as a sort of vaccine against the more malignant forms.

Having discovered this, Pasteur next tried to attenuate the virus of splenic fever in like manner but at first was not successful because the bacillus when cultivated would form spores, and the virulence of these spores did not diminish. At last he found that by keeping his culture broth at a comparatively high temperature, about 100° F. spores did not form, the attenuation could be obtained, and that this attenuated virus could be used as a vacine against splenic fever. This sort of vaccinnation is now undergoing a very extensive test in Europe—a large number of cattle in France, Germany and Hungary having been inoculated for this purpose.

What may be the real value of this protective inoculation is as yet uncertain; in part, because sufficient time has not yet elapsed to enable us to say whether the protection is permanent, in part, because this attenuated virus may reassume its virulent properties if cultivated in young pigs—and very possibly under other circumstances.

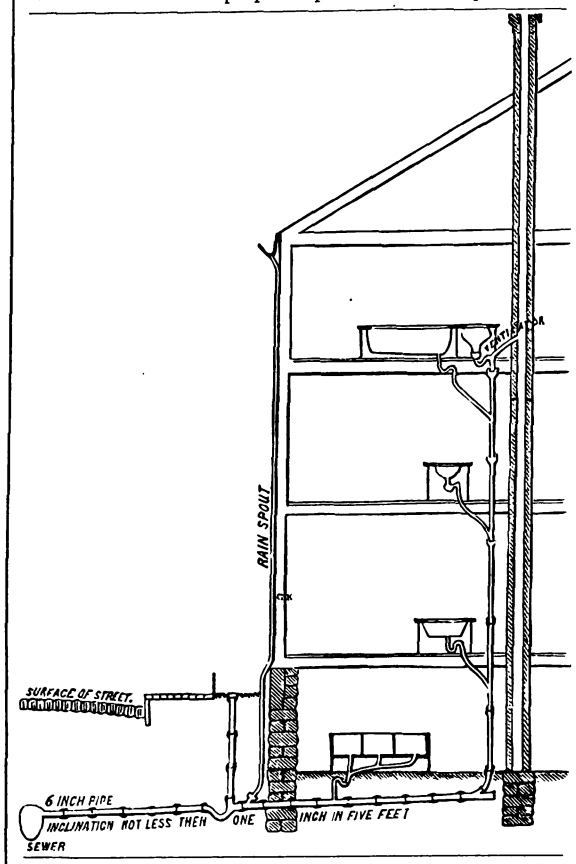
[TO BE CONTINUED.]

The Municipal Commission of Paris, appointed to study the question of improved dwellings for the working population, have held a meeting at which it was decided to find out and classify those unoccupied sites belonging to the Communes in the poorer quarters of the city, the most suited for the construction of cheap tenements; to establish the conditions, plans, etc., of the proposed buildings; and to arrange for the carrying out of the work.

New hotel regulations: Guests jumping from fifth-story windows will be charged extra. In the office of the hotel is a large fire-proof safe; the proprietor will not be liable for any guest who does not deposit himself in it for the night. Johnson fire pumps, served in the rooms, charged extra. Guests are requested to pay their bills before going to bed, as they may not have time while the fire is burning.—*Philadelphia Chronicle-Herald*

FRESH AIR INLET.

Col. Geo. E. Waring, Jr., has sent us the illustration of which the accompaning sketch is a reproduction. Though the interior arrangement is not in accordance with what we now consider the proper requirements, we reproduce it



because the fresh-air inlet is shown. The interesting point is that this was in a report on sewerage made in 1873 by Mr. David W. Cunningham to the City of Lowell.

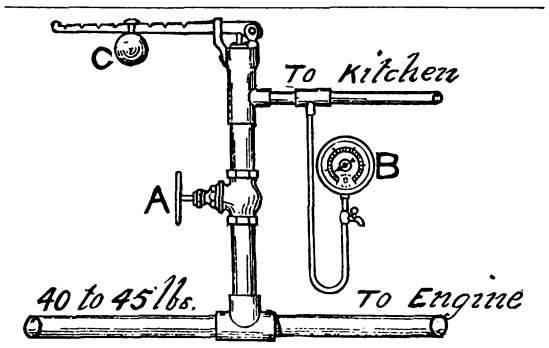
EXPLOSION OF A STEAM TABLE.

LONDON, W., *Jan.* 31, 1883.

To the Editor of THE SANITARY ENGINEER:

I cannot quite endorse what you say as to the non-staying of steam pads such as used at the Lochiel Hotel (SANITARY ENGINEER, Vol. VII., p. 148).

I have for years constructed similar fittings, and in scarcely any case is it necessary to stay them, being one-half inch thick, and the steam admitted at three pounds at the greatest, and the condense full open three-quarter inches, little or no pressure is likely to be felt on the surfaces, as the steam being admitted at so low a pressure is condensed almost before it passes through the table. But on "no" account in these fittings should the stop valve be



placed in the condense pipe, as is, I am sorry to say, often done with the false notion that more heat is obtained. This, perhaps, was the cause of the explosion at the above hotel.

I see the steam was from the engine condense; now this is unfair to the engine, as it must tend to give a back pressure to the engine.

What I do if I get steam for cooking and serving purposes from the engine boiler, say at 40 to 45 pounds, is to fix a stop valve at *A*, with a gauge glass above it at *B*, and a safety valve at *C*.

It will be seen that by closing *A*, the steam can be regulated to any pressure on the glass *B*, say ten pounds, or what is required in the boiler room to give five in the kitchen department. If by any chance it gets over ten the safety valve relieves it, and so prevents accidents which would otherwise occur.

Reducing valves, however good, when once fixed are seldom or ever touched, whereas this small contrivance speaks for itself.

Trusting if this is not quite clear I may be asked for further explanation, I am yours very truly,

F. BOTTING.

[The arrangement described above will do, if one has a weak steam table which he will not abandon for a strong and properly stayed one, *provided there is no valve on the waste* or condensed water pipe. But it must also be attended with a comparatively great loss or waste of steam.

It all depends on the attention given to the valve *A*. If *A* is not opened sufficiently the cook soon knows it, because his table is not hot enough to suit him; but he cannot tell when he has the maximum heat (without wasting), the return being open.

The notion that heat is *obtained* by a valve in the waste pipe *is false*, but that heat can be *retained* by it *is correct*, and furthermore the temperatures can be increased by it (by increasing the pressure), which is often desirable.

But the real question is, Why construct any apparatus so frail (when it is possible to do otherwise) that special contrivance, liable to get out of order, have to be arranged to prevent its bursting?]

HYDRAULIC RAM.

CHARLESTON, WEST VA., *Feb.* 24, 1883.

To the Editor of THE SANITARY ENGINEER:

I have a few questions to ask you in regard to elevating water with a hydraulic ram. I want to furnish water to tank, as shown in plan on other side; you will please tell me how much water it will furnish in 24 hours, or will it work at all? Answer by mail or through your valuable paper, and oblige,

Yours respectfully, FRANK FERGUSON.

[If there is plenty of water to waste, a ram will work to advantage in the case described. It will require about 15 gallons of water to operate the ram for every gallon delivered into the tank.]

The Savannah, Ga., aldermen have passed an ordinance fixing the amount of the bond given by plumbers and gas-fitters for the capable execution of their work at $2,000. During the consideration of the ordinance, a petition from the plumbers of the city was read asking the adoption of a measure that would enable them to give bonds in a prescribed sum, and not become liable for indefinite damage as under the previous ordinance.

The *Sanitary News* reports a case where a gentleman desiring a comfortable home gave his architect most definite instructions, but soon found that hardly anything was being done as he had directed. Finally, he thought he saw something wrong in the laying of the main drain, and reported to the architect, who was to be held responsible for defects. The workmen insisted that everything had been done just exactly as it should have been. The drains were dug up, nevertheless, and it was found that no connection had been made with the street sewer at all. The last section of the pipe had been too short by several inches, and to the crafty drain layer, who was interested in saving time and material, it was not considered necessary to lengthen it. The fresh-air duct leading to the furnace had been ordered to be built of unusual capacity, for the reason that the owner wanted none of the common difficulty about getting sufficient air to ventilate as well as warm his house. He watched the work on this air-duct very closely, and was congratulating himself that it was well made, but at last discovered that the workman narrowed the inlet by drawing in each succeeding course of bricks as he neared the top. When remonstrated with he said he thought he was doing the proper thing, as the duct wouldn't let in so much cold air if smaller. So in everything done about the house; the workmen had no more conception of the purpose which a healthy, comfortable, and convenient house was to serve than the tools which they used.

The school building at Nos. 278 and 280 Second street, this city, has been ordered vacated and torn down, in consequence of a report by Examiner Reily that the whole building was ten inches out of plumb, the front badly bulged, the west wall settled and cracked, and the rear wall overhanging about eleven inches.

Pipes froze and burst in a commercial building in Chicago. The plumbers who made repairs left a faucet running into a wash basin on the third floor when they went away. The waste-pipe being choked up the water ran over the floors and poured down into the basement and damaged $7,500 worth of goods. The building has always been an unfortunate one for its tenants. It was put up as a cheap, catch-penny affair.

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CONNECTING A SINGLE BOILER WITH TWO RANGES.

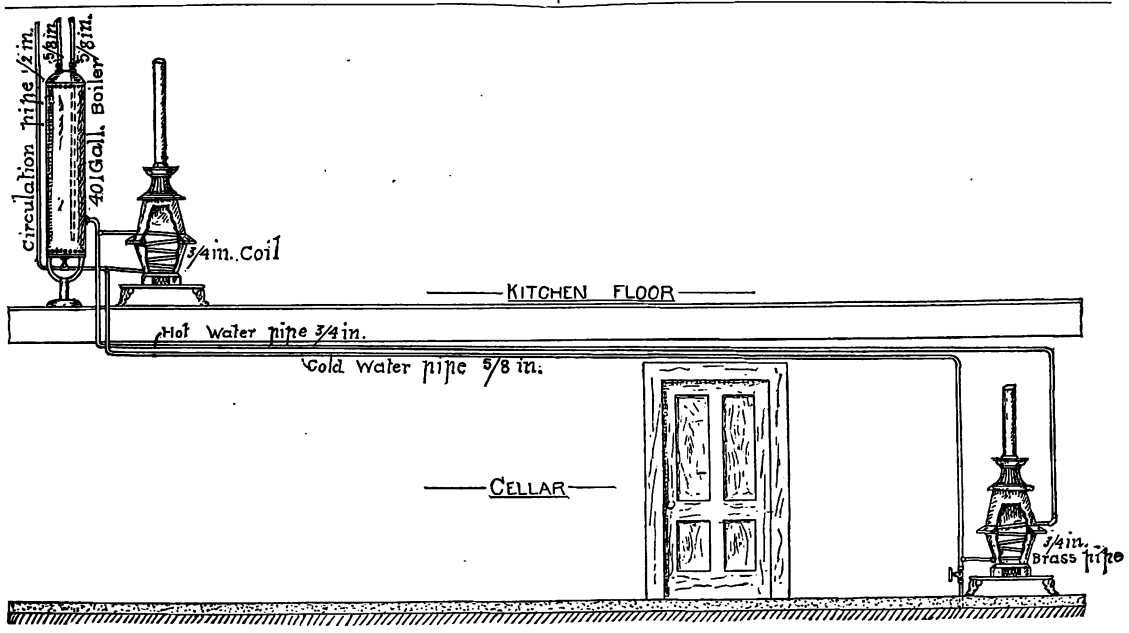
ST. PAUL, MIN., *Feb.* 23, 1883.

To the Editor of THE SANITARY ENGINEER:

Please give me through your valuable columns the information of which I am in very much need. I fitted up a house a year ago and connected the boiler and stoves as shown in sketch, but failed to get hot water at fixtures upstairs when using stove in basement alone. I have tried most every way, but without success. Is it possible to heat water hot in such a case without the use of two boilers, and if so, which is the proper way to connect two boilers and two stoves with the same pipes? The stoves are good size ordinary wood stoves. Yours respectfully,

J. J. H.

[We presume when you say, "you fail to get hot water at the fixtures when using only the stove in the basement," that you do not get the water sufficiently warm. When the lower stove only is in operation the circulation is divided part of it circulating into the boiler, and part of it going through the coil in the upper stove; the upper coil



and all the long pipes being cooling surfaces for the water within them, and radiating surfaces to the surrounding air and objects. The draught alone through the upper stove, when it is cold, being a large cooling factor, not considering the long pipes, but taken together, they *may* be nearly equal to the heating power of the lower coil.

To get the best result you should cover your pipes and have a separate set of connections put on the boiler; but at the least you should cover the pipes and have an extra side connection on the boiler, to which to attach the hot water pipe from the lower coil.]

PLUMBING IN CINCINNATI.

(From our Special Correspondent.)

CINCINNATI, *March* 8, 1883.

Plumbing in Cincinnati is without any regulation. The duties of the Sanitary Department under the law have been confined to declaring overflow vaults, stagnant ponds, etc., nuisances, and plumbing has been done without any inspection, and to suit the proprietor's idea of economy. There are, therefore, vast numbers of sewer connections without traps or ventilation, and in comparatively few cases are the latter carried above the eaves. At first—that is many years ago—the plumbing was done by plumbers exclusively, but many, without any practical acquaintance with the art, have gone into the business. Formerly skilled plumbers were employed and their bills for artistic work paid; but latterly it has been the custom to give out to the work the lowest bidder. This has doubtless proved cheaper to the builders of tenement houses who look rather to the income on the investment than to the health of their tenants; but it has thrown much of the plumbing work into the hands of incompetent men. How many lives have been sacrifices within the last ten years to this economic spirit will never be known. A short time ago one man lost three children, which he attributed to bad plumbing that had to be all done over again. Another detected, just after it had been completed, that his house had been converted into a death trap, and paid a responsible plumber as much as the original cost to take it out and replace it properly. The plumbers have made an effort to have plumbing regulated, and to that end had a bill introduced, similar to that of your State in its provisions. But our State Solons, on whose suggestion is not known, conceived that it was in the interest of a class of business, and not of the general public, and laid it on the table. If all the plumbing work in Cincinnati could be uncovered there would doubtless be a marvellous revelation of bad work.

The Master Plumbers' Association of Cincinnati, at their meeting March 6, elected Hugh McCollom, President; John McNiel and Jas. Attlesey, Vice-Presidents; Wm. Ricketts, Treasury, and James Allison, Secretary for the ensuing year.

Judge Tuley, of Chicago, describes the condition of the jail and criminal court building in that city to be as follows:

"It is improperly constructed and improperly conducted. I discovered that the air I was breathing in the court-room had to pass over all the catch-basins in the building. In the basement, where the boilers for steam-heating are situated, no pure air enters, as the windows are kept constantly closed. The air in the basement is all the air we get throughout the building, and originally impure, it gets denser and more nauseating as it ascends, passing through pipes and ventilators placed over the closets. While sitting on the bench over there I frequently became sick at the stomach, and on investigating the cause discovered that I was inhaling the odors from a catch-basin situated immediately beneath an air-hole near the bench. The jail building is in the same condition. All the air they get in the jail comes from the basement where the boilers are, passing through a tunnel where the steam-pipes are laid. There was formerly a conduit through which fresh air could enter, but this was cut through in order to run the sewers, and has not been used since 1877. A well-hole outside in the court, which the engineer says frequently becomes half filled with water, is also unused. The large fan with which the air is distributed throughout the building might be a good thing if it didn't distribute impure sir. It gathers the impurities from the well-hole, which is impregnated with the filth of the sewers, and it dispenses it to everyone who is either in the court building or the jail."

This is the building which was recently the subject of a severe report by the Grand Jury.

The *Builder* of Jan 27 contains an article on heating and lighting, in which it is affirmed that—

"In America, in Germany, in Austria, it is only the vulgar and the uncultured population, the careless and indifferent, who heat their houses and workshops uncomfortably or unhealthily,—and unfortunately, in all countries, the uncultured and the indifferent form a terribly large number of inhabitants; but in America, in Germany, and in Austria, whenever consideration is given to the subject, as it is given invariably in the houses of the tolerably well-to-do, the mode of heating is simply perfect, and in all cases at a cost infinitely less than in England, where, had people of limited means to warm the very large rooms that most families on the Continent habitually occupy, they would have very little left of their incomes to supply the other wants of existence. After all, the most perfect way of heating large apartments consists in two essential requirements; in the first place, well-planned, well-secured, double-windows, without which no means of heating whatever will be effective; and, in the next place, a well-made 'porcelain' stove in which hard coal can be easily burned, by which means a room 30 feet square, and proportionately high, may, in the coldest weather, be kept at a perfect temperature, or as high as individual taste may desire, at no very considerable cost. The simple expedient of the double window is enjoyed by the poorest throughout Germany and Austria, while the 'porcelain' stove is rapidly replacing the abominable and unhealthy iron stove of the past."

We wonder whether the writer of this article ever heard of ventilation. It will be news to most of us that our systems of heating are "simply perfect." However, we suppose from this phrase that the author is of the æsthetic school, and that the article is prepared with a view to "general gorgeousness" rather than with any idea of giving useful advice or information.

The eighteenth annual report of the trustees of the Peabody Donation Fund shows the total fund on the 31st of December last to have been about $4,000,000. Since the last report, the trustees have opened 28 blocks of buildings at Great Wild Street, containing 1,670 rooms. Thirty-three blocks are now in course of erection which will contain 1,885 rooms. Up to the end of the year, the trustees had provided for the artisan and laboring poor of London, 7,829 rooms, exclusive of bath rooms, laundries and wash-houses. These rooms comprise 3,533 separate dwellings, occupied by 14,604 persons. The average rent of each dwelling was about $1.10 per week, and of each room 50 cents. The rent in all cases includes the free use water, laundries, sculleries and bath-rooms. The birth-rate for the year in the buildings reached 45.04 per 1,000, which is 10.74 per 1,000 above that of all London for the same period. The death-rate was 18.42 per 1,000, which is 2.98 per 1,000 less than London. The infant mortality was 137.41 in each 1,000 birth, or 13.59 per 1,000 below that of London.

APPARATUS FOR DISINFECTION OF CLOTHES, ETC.—In several hospitals in Berlin, Stettin, and other parts of Germany, the disinfecting apparatus of Schimmel & Co., of Chemnitz, patented about a year ago, is now used. The agent is heat (both moist and dry). The general arrangement is as follows:— There is a large case with double walls of sheet metal and a bad heat conductor between. This communicates with a chimney at the top behind, and in front has two doors; the upper doorway admits a frame-bearing wagon on rails, and the lower another wagon, also on rails, with the heating system. The former wagon has a permeable bottom and cross bars in the frame, from which are hung in linen bags the clothes to be disinfected. The lower wagon carries a thick tube which returns (horizontally) on itself, and bears a series of projecting ribs. Above and parallel with it is another tube of copper, with numerous small holes to let steam out. When the laden clothes wagon has been pushed into the upper part and the door shut behind it the steam valve of the of the connection with the rib tube system is opened, as also an air valve below and the chimney valve, and the heating proceeds till a thermometer, readable outside, marks 110° C. Then the steam and chimney valves are two-thirds closed, and the other steam valve, that of the perforated tube, opened. The steam is thus allowed to act directly about 20 to 30 minutes. After this tube is closed further heating by the other system is continued about a quarter of an hour, the ventilating valves being fully open. The process of disinfection lasts 1¼ to 1½ hour. The upper wagon may then be taken out and laden afresh.—*London Times.*

The Austrian Government Sanitary Council has prepared a set of regulations for life-saving on railways, and a guide to first help to those injured by accidents until the arrival of a physician. These have been sent to the several railway companies for examination and suggestions. Every conductor is to be provided with a leather case of bandages; a litter to be placed at every station and halfway between such stations as are more than nine miles apart; at every station a small case of surgical instruments, of specified kinds, is to be kept; that a larger supply of instruments and bandages at stations fifty and sixty miles apart, where there are reserve locomotives, which locomotives are to pick up the cars and litters on the way to an accident. Still more complete provision is to be made at important stations where there are many servants. For every 250 or 300 miles of road, at an engine-house, there must be an hospital car, of a specified pattern, used for carrying sick and wounded in time of war. The guide to first aid to the injured prescribes how the servants or others shall carry the victims of accidents, how place them, treat their wounds, apply bandages, transport them in the cars, and what to do in case of sudden illness.

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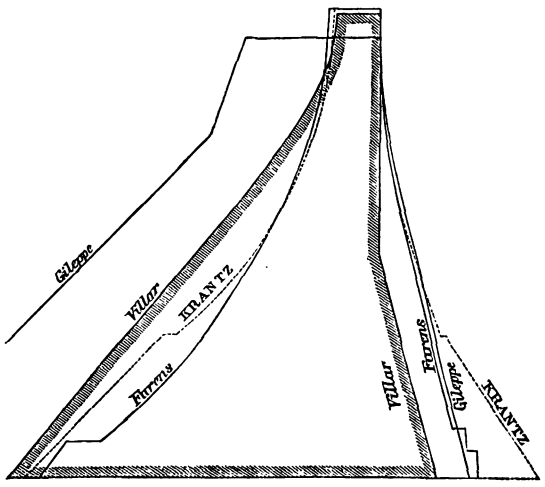
VILLAR RESERVOIR ON THE RIVER LOZOYA.*

BY EDWARD JOHN THEODORE MANBY, M. INST. C.E.

The Isabel II. Canal, which conveys to Madrid the waters of River Lozoya, began originally at a point called Ponton de Oliva, where the required level was established by a dam 92 feet high. A supplementary dam, 16 feet high, was subsequently built at Navarejos, about three miles further up the river, and the canal prolonged up to that point; but the combined capacities of these reservoirs proved insufficient to meet the growing requirements of the capital, and it was decided in 1869 to construct a large storage reservoir at Villar, about 14 miles above Navarejos, capable of holding 20 million cubic metres (4,400 million gallons).

The construction of this dam began in June, 1870, and ended in 1878. The dam is curved in plan to a radius of 440 feet, the convexity being of course on the upstream side. The total length of the dam at the top, measured along this curve, is 546 feet, out of which a length of 197 feet on the right bank is eight feet three inches lower than the remainder, thus providing an outlet for the overflow of the reservoir. The overflowing water is directed down the valley, and kept from falling on the foot of the dam by a guide-wall 60 feet long, running radially to the curve of the dam, from the inner end of the outlet. An iron bridge, consisting of twelve spans of 16 feet, runs across the outlet, carrying a roadway which continues along the



top of the higher portion of the dam. It was necessary to provide a crossing for horses and foot-passengers over the dam, to replace the Villar bridge drowned by the reservoir.

The maximum height of the dam in the centre of the valley, from the bed of the river to the highest level the water can attain, *i.e.* the level of the overflow, is 162 feet one inch. The higher portion of the dam rises to eight feet three inches above this level, and is provided with parapets.

The figure of the cross-section of the dam can be very approximately described as follows:—The inside or upstream face is vertical from the line of the highest water-level to a point 84 feet three inches below, whilst the outer or downstream face batters at an irregular rate down to the same level.

The thicknesses down to this level run as follows:—

	Feet.	*Inches.*
At and above overflow level	14	9
" 10 feet below overflow level	16	5
" 20 " " " "	19	4
" 30 " " " "	24	3
" 40 " " " "	30	2
" 50 " " " "	36	9
" 60 " " " "	44	8
" 70 " " " "	52	10
" 80 " " " "	61	4
" 84 " 3½ inches below overflow level	65	11

From 84 feet 3½ inches below overflow-level the inside face batters 1 in 3.57, and the outside face continues with a uniform batter of 1 in 1.163, till they respectively strike the rock in the bed of the river.

Two galleries run through the dam at a depth of 143 feet below overflow level. Each of these has a clear inlet area of 19 square feet divided into two compartments, closed by sluices governed from a central tower built on to the inner face up to the level of the roadway. These sluices are worked by hydraulic power derived from a spring found on one of the banks 2,000 feet distant from and about 200 feet higher than the dam. The strain on each sluice-rod with a full reservoir is 8½ tons.

*From Proceedings of the Institution of Civil Engineers.

Besides these two galleries, four tunnels have been driven through the rocky sides of the valley to provide an outlet for flood-waters, and avoid, if possible, the higher overflow coming into use. Two of these issue from the same level as the galleries, a third one from a point 50 feet higher, and a fourth from a point 77 feet higher.

The whole dam is built of hydraulic rubble masonry, except the lower part of the tower and the top course of the dam, which are of ashlar.

The total cost of the reservoir, including the bridge and the tunnels, was £80,556. The materials were supplied by contractors, and cost £42,000. The construction was executed by day labor, and cost £38,566.

The sectional area of the dam from overflow-level down to a horizontal line 162 feet 1 inch below is 1,275 square yards, and may be considered as a fairly light one. The Furens dam, which is of about the same height (164 feet), only measures about 1,200 square yards in area; but the Gileppe dam, if carried up to the height of 164 feet (which emergency was contemplated and provided for by its designers), would present an area of 2,130 square yards. The type calculated in Krantz's work for a height of 164 feet has about 1,330 square yards area.

The Villar dam is slightly narrower at the base than the Furens dam, and much narrower than the Gileppe dam, or Krantz's type. Its thickness at 162 feet below overflow is about 154 feet. The Furens dam measures 159 feet at the corresponding depth, according to the plate in Krantz's work, and the Gileppe 216 feet. The Krantz type, for a height of 164 feet, gives 185 feet as the proper thickness at base.

Fig. 1 represents the comparative outline of the sections of the Gileppe, Furens, and Villar dams. Krantz's type is figured in dotted lines. The outline of the Furens dam has been taken from Krantz's work. That of the Gileppe dam has been plotted from the dimensions given in a notice printed in these Minutes, vol. xlviii., p. 312. The Villar dam was designed and constructed by Mr. José Morer, Chief Engineer to the Spanish Government.

NOTES FROM CHICAGO.

(From our Special Correspondent.)

CHICAGO, *March* 1, 1883.

The floods along the Ohio River, besides arousing in this community thoughts of relief, have revived interest in a question of home protection. Six years ago an overflow of the Desplaines River, ten miles west of the city, caused $100,000 damages in the southwestern section of Chicago, and the conditions lately have threatened another destructive visit of the waters. Similar overflows have happened almost annually. The trouble—to put the case in a nutshell—has always arisen from the gorging of ice at a sharp turn (almost a right angle) in the river at Summit, ten miles to the southwest, and the flowing back of water (reversing the current) through the Ogden Ditch (built for drainage purposes) into the West Branch of the South Branch of Chicago River. At this sharp bend, high rocks rise on one bank, skirted by the Illinois and Michigan canal, and a marsh stretches away on the other. The proposed remedy of straightening the river is impracticable on account of the cost of cutting through the rock. A plan now favored by the Commissioner of Public Works is to cut through into the canal, and put in locks, thus affording an extra outlet when needed. Time and money from the treasury of Chicago will be required for this, and in the meantime, Commissioner Cregier advises that extra precautions be taken (by the imployment of a large force of men during the spring freshets) against an ice gorge. Chicago is needing not a few public works, and this, from a sanitary standpoint, is not one of the least.

Health Commissioner DeWolf returned Saturday from his official mission of inspecting morgues in other cities, and a decent and, indeed, a model institution of the kind in this city is likely to result. I chanced to run across the Doctor this morning and asked him about his travels. While not disposed to criticise he said that the Philadelphia morgue was the worst he ever saw; Boston's was the newest, and New York's, on the whole, the best. Cincinnati's—well, it hadn't any to speak of. Plans for the Chicago morgue are now being drawn by Architect Genüng, Chief Inspector of Buildings. It will likely cost $25,000.

To turn to a matter of more living interest, a city ordinance exists requiring that all wires for telegraph, telephone, etc., in Chicago shall be underground by May 1. Indeed the charter of the absorbed Mutual Union contained a provision that their wires should be buried by this present date. The Western Union, however, since the consolidation, have strung many wires on the old poles. The only move toward carrying out the ordinance has been made by the Chicago Sectional Electric Underground Company, which, since Monday last, has been employing one hundred men in completing a mile of conduit on Wentworth avenue from Thirty-ninth street north. The conduit is four inches square, with capacity for 1,000 wires and is buried at the average depth of two feet.

Experiments will be made in a few days, by city officials among others, and if expectations are realized, the heart of the city will be lighted by electricity via this conduit by April 1. If the ordinance should be enforced rigidly, as some aldermen want it to be, here is an underground sheath for the various wires.

All public school buildings are being visited in turn by the building inspectors, and the result is divers recommendations in the alleged direction of greater safety from fires.

A similar motive shows itself in the continued aldermanic opposition to buildings over six stories, say, in height A prohibitory ordinance is probable, except where the fire-proof character can be guaranteed.

Chicago plumbers—a subject not least if mentioned last—are priding themselves on the good words which THE SANITARY ENGINEER has editorially said of them, and on the inner consciousness that the encomiums were all deserved. The meetings of the craft this past season have been largely attended and a credit in every way to the fraternity, and it has simply been the proper thing for other cities, as they have done in several instances, to send in for suggestions and advice as to how they should best form like useful organizations for themselves.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

Mar. 9, 1883.

A regular meeting of the Society of Civil Engineers was held on the evening of March 7, 1883. Vice President Wm. H. Paine, in the chair, John Bogart, Secretary. Messrs. H. D. Gates, of San Francisco, Gustav Lehlbach, of Newark, N. J., were elected members, and Wm. J. Haskins, of New York, a junior member.

The ballots for the amendments to the Constitution were canvassed.

A paper by Hamilton Smith, Jr., M. Am. Soc. C. E., of San Francisco, on the Flow of Water in Pipes, was read, giving the results of many experiments upon the discharge of water through circular pipes, ranging from ½ an inch to 4 feet in diameter, and with velocities from one-sixth of one foot to 20 feet per second.

This paper was discussed by Messrs. T. C. Clarke, J. J. R. Croes, Cooper, J. P. Davis, Emery, North and Wm. H. Paine.

At a recent meeting of the council of the American Society of Mechanical Engineers, Professor F. R. Hutton, of Columbia College, School of Mines, was elected Secretary of the society. The society's new office is at 15 Courtland street, room 78, and is open from 10 A.M. to 5 P.M. The Secratary's hours there are from 2 to 5 P.M., and at his up-town office, 50th street and Fourth avenue, from 10 A.M. to 1 P.M.

At a recent meeting of the Port-Glasgow (Canada) Town Council, Mr. Smith, meter-taker of Glasgow, was, by the casting vote of the chairman, elected to the office of water inspector. There were 134 candidates for the position.

Dr. G. W. Benson has been nominated and confirmed as Health Commissioner of Baltimore. He was first appointed Health Commissioner in 1872 and served one year, was again appointed in 1882, and is now reappointed. Much opposition was made to his confirmation, and the vote stood 14 for and 13 against.

A case recently before the Supreme Court of Wisconsin brought out the necessity of preparing a contract for building. The builder upon demanding his money was confronted by the owner, who claimed that he had used rotten timber. The contract, however, had stipulated the fact that the decision of the architect as to the quality of the material should be final. The latter having approved the timber, the owner had to foot the bill.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
March 10....	25.54	18.86	21.76	27.93	29.82	18.99

E. G. LOVE, Ph.D., *Gas Examiner.*

ELECTRIC LIGHT NOTES.

Trials of incandescent lamps in the trains running between Brussels and Antwerp are reported not to have resulted successfully because of the irregularity in the source of current.

The Edison Electric Light Company are wiring the "Da kota" apartment house (at Fifth avenue and 72d street) for 5,000 sixteen-candle power lamps, and the new sugar refinery of Messrs. Havermeyer & Elder (Brooklyn) for 900 lamps.

The French Government has decided to supply several of their men-of-war with Gramme machines and electric lamps. Among vessels already fitted up with incandescent lamps is the Redoutable. The lamps are Swan, the current supplied by Gramme machines driven byBrotherwood engines.

Pall Mall Gazette says that two eminent electricians promise to produce in a few months a perfectly practical electric tricycle, capable of running fifteen or twenty miles without recharging the accumulators, and able to ascend all such hills as are now possible for the foot tricycle, and even steeper gradients if auxiliary foot gearing be used to help the electromotor when the incline is great. The weight of batteries will not exceed the weight of a second rider, and will run at the rate of seven miles an hour.

The ballet at the Princess' Theatre, Manchester, in which twenty-six ladies take part, has for the past month been danced nightly by the light of small Swan lamps placed in a flower on each lady's head. The current is supplied by a small battery, the weight of which is about 1½ lb., carried on the back of the dancer, as at the Savoy Theatre. None of the ladies are at all frightened; in fact, they like it so much that the principal dancer, Miss A. Holt, has arranged to have her dress covered with the lamps, which will be done ere this is in print. The arrangements have been carried out by Mr. H. Bury, of 46 Market street, Manchester.—*Electrician.*

The Bulletin of the Edison Electric Light Company gives the following particulars about the installation in the Berlin Academy of Fine Arts. It consists of two grand electroliers at the entrance on the street, each mounted with five 32 candle lamps; 50 B lamps in a gigantic model of the Crown Prince just inside the entrance; on the staircase and in the vestibule are four three-lamp brackets and a chandelier with 12 A lamps; in the first *salon* four "sunburners" each with 15 A lamps; in the second *salon* are four chandeliers, two of which are each mounted with 18 A lamps, and two with 36 B lamps; a long gallery has five chandeliers, each with five A lamps; and a small *salon* has one chandelier with eight A lamps.

At a late meeting of the English Board of Trade the Secretary, Mr. Farrer, stated the conclusions which the Board had arrived at with reference to the electric lighting of the vestries. They wished the local authorities to act for themselves. If two companies applied for the same district the vestry must select the company. The Board would have no bogus companies. The area of supply chosen by the company must be restricted. The company and the vestry must agree on the area, and the Board would see that the company had enough means to work the area selected, and the money required must be set aside for that district. As regards the company's profits, and as to any portion of that profit going to the public, the Board would not listen to such a suggestion. The price must be regulated by competition with the gas company, and, if necessary, with other electric companies. Provision for safety against fire must be left to the public, the company and the fire insurance companies. No meter had yet been found to satisfy the Board; but when one was found it would be introduced.

Food and Drugs.

FOOD ADULTERATION IN CANADA.

Mr. E. Miall, Acting Commissioner of Inland Revenue, has made his report on Adulteration of Food in Canada for the year 1882. He gives the following table which shows the number of samples examined and the proportion adulterated:

Name of Samples.	Genuine	Adulterated.	Doubtful.	Total.
Baking Powder.....	17	..	..	17
Bread.....	81	1	1	83
Butter.....	141	48	8	197
Canned Fruit.....	24	2	..	26
Chocolate.....	54	..	..	54
Cocoa.....	43	10	..	53
Coffee.....	22	47	..	69
Flour.....	18	..	..	18
Ginger.....	7	16	..	23
Milk.....	130	59	13	202
Pepper.....	14	28	1	43
Potted Meats and Fish..	20	3	..	23
Spices.....	34	32	..	66
Sugar.....	65	..	..	65
Sweets.....	61	5	..	66
Tea.....	63	23	2	88
Water.....	15	14	..	29
Total.....	8[illegible]	283	25	1,122

The percentage of adulteration for 1882 was 25.66, as compared with 25.97 for 1891, There has been a decrease in this respect since 1876, when the percentage of adulteration was 51.66. For the past four years it has varied from 25.66 to 28.28; and from the figures given it is fair to infer that under present circumstances about one-fourth of the samples examined will be found to be adulterated. At present the Department merely publishes the results of the examinations, but were it to adopt a rigorous system of prosecutions, the number of adulterated samples would be considerably less. In speaking of canned fruits and meats, the Commissioner calls attention to the increased contamination of the contents of the cans with tin, etc. by age, and suggests that "manufacturers would consult best their own interests if they caused the packages to be stamped with the year when they were filled and sent out. Buyers could then purchase with some security, avoiding the risk of being taken in by goods packed for several years, and re-labelled in order to pass them off."

THE SALE OF SKIMMED MILK.

To the Editor of THE SANITARY ENGINEER:

I see by the daily papers that a bill has been introduced in the Assembly at Albany providing for the marking of milk cans in such a manner as to show the quality of the contents. Against such a bill I beg to enter my protest in the strongest terms. Instead of being a protection to consumers, it opens one great avenue for fraud by legalizing the sale of skimmed milk. The frightful mortality among children under five years of age in our city, shown by official records to be 45 per cent. of the total mortality, is known by all who have studied the subject to be caused by improper food, of which milk constitutes such a large part. The great objection to skimmed milk is that a large proportion of the fat globules, which make pure milk so nutritious, has been taken away. Feeding on this poor low-grade food creates a low vitality and predisposes the child to disorders that are so fatal during the summer months.

If this is the condition of things when the Board of Health employs inspectors to watch the milk coming into the city, and when there are laws providing for the punishment of those found selling unwholesome milk, what will be the mortality when the sale is legalized? Certainly not lower. Then, again, the low price at which it would be possible to sell skimmed milk, would induce multitudes of the poorer classes to buy it in preference to the pure and therefore more expensive article. Should the law permit the sale of an article in this city which is totally unfit for the purposes to which it is applied, and therefore dangerous?

It may be asserted that skimmed milk is a commercial article, and its sale cannot therefore be prohibited. Is not nitro glycerine a commercial article? and yet there are laws restricting its sale. Would it be safe to put it within the power of every boy to buy nitro glycerine? The public protects its members from dangers in one form; why should it seek to remove the safeguards against another? This bill is no new thing. It has been brought up year after year, and has either failed to pass the Legislature or has been vetoed by the Governor. Very much the same thing has been tried in other States, and it has been found that the law permitting the sale of skimmed milk from marked cans is a failure, and does not protect the public in any way, but on the other hand, the law offers a premium to the dealers in the fraudulent article. If this bill becomes a law, it will not only open the way for fraud, but, what is perhaps worse, take away all power of inspection vested in the Board of Health by the provisions of the Adulteration of Food Act, and the sanitary code. There are laws enough already to protect the community from the dangers of the indiscriminate use of skimmed milk. If the legislators are very anxious to do good let them provide for a yearly appropriation of money sufficient for the thorough inspection of the Board of Health under existing laws, of the half-million quarts of milk coming into this city daily. F. N. O.

[So far as we can learn the demand for this law does not come from milk consumers. We have, on previous occasions, expressed our views on the subject, and they have undergone no change. We trust the bill will not become a law. ED. SAN. ENG.]

EXAMINATION OF AMERICAN CHEESE.

Mr. A. B. Griffiths has recently communicated to the *Chemical News* the results of his analysis of four samples of American cheese purchased in London, The results are as follows:—

	No. 1	*No.* 2	*No.* 3	*No.* 4
Water.....	23.49	28.20	26.55	31.81
Caseine.....	36.21	37.01	35.58	36.10
Fat.....	34.92	30.18	33.85	28.68
Ash.....	5.24	4.51	3.90	3.40
	99.86	99.90	99,88	99.99

"The author also made a separate analysis of the rind in each case, and in samples Nos. 1 and 4 a small amount of arsenic was found. This was probably applied to the external surfaces of the cheeses to prevent the attacks of insects, etc., a practice which is dangerous to the consumer, and ought to be prohibited by law." The cheeses were also examined microscopically for vegetable fibers etc., and starch granules, but none were found.

The National Health Society of Great Britain have appointed a committee including Dr. Lauder Brunton, F.R.S., Dr. Farquharson, M.P., Dr. Cameron, M.P., Mr. Carr, and others, with the view of obtaining legislation to prevent indiscriminate use of arsenical and other injurious pigments in dress materials without mortification to the purchasers. Arrangements have been made for holding an exhibition of hygeinic dress, decoration, and domestic appliances on a large scale in London early in the coming season.

The Prince of Wales, President of the Society of Arts, writing to the late Sir Henry Cole, who had devised a scheme for organizing guilds of health in every parochial district in the United Kingdom, to supplement the local boards, say that "the labors of the Legislature to improve the broad conditions of health generally throughout the United Kingdom and the efforts of all local sanitary authorities, should be supplemented by the knowledge and exertions of every every individual. I conceive it to be most desirable that every one should make him or herself acquainted, not only with the elementary rules which science may give us, but also with the work of existing organizations for the preservation of good health, and I do not hesitate to express the opinion that it would be a most humane deed to set in motion measures by which everyone could be encouraged and assisted in obtaining practical information in connection with this subject."

CITY HEALTH DEPARTMENT NOTES.

No serious violations of the plumbing regulations were reported last week. Two trivial cases were reported by Inspector Eagleson. No violations of light and ventilation plans were reported. No cases were referred to the attorney.

During the month of February 6,458 persons were vaccinated by the Vaccinating Corps, of which almost all were in schools and public institutions.

An unusual quantity of "bob veal" is appearing in the markets. Over 4,000 pounds were siezed and condemned by the meat inspectors at the freight station of the Hudson River and Harlem railroads on Thursday of last week, and nearly as much a few nights before at the New Jersey ferries. Large quantities are also brought from Long Island. Some of the calves seized were said to be not over two days old.

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Novelties.

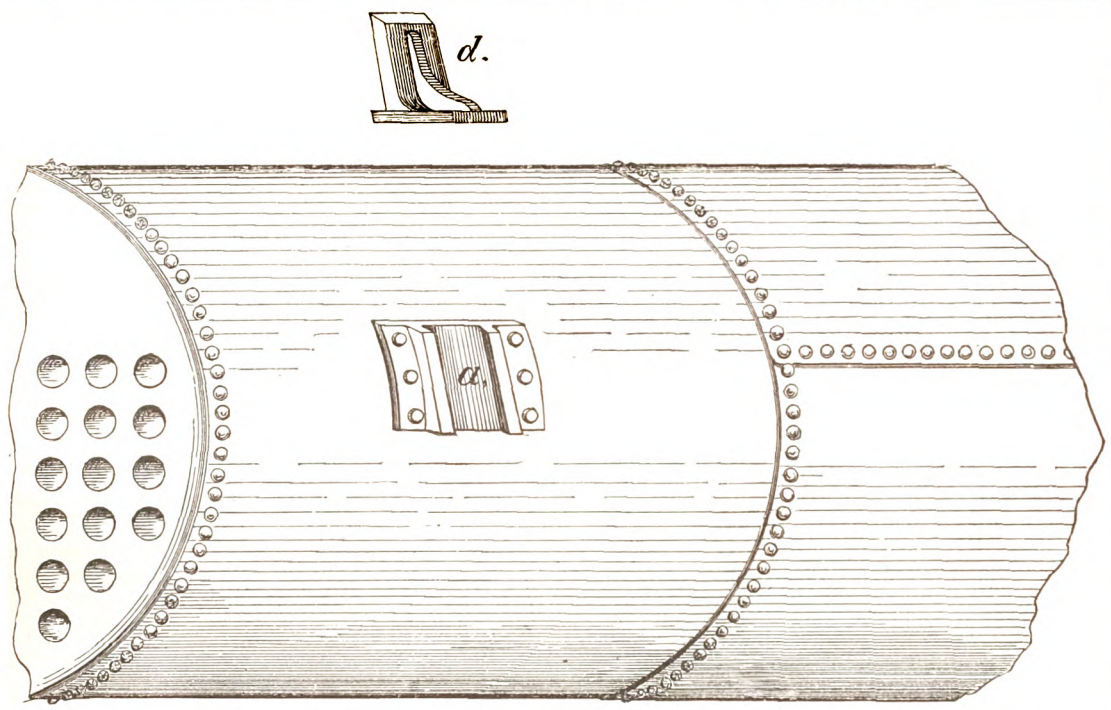
Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

BOILER LUG.

This week's illustration represents a horizontal boiler *lug*, which is separable.

The shoe *a*, is riveted to the boiler shell before the tubes are put in, so as to admit of having the "point" or driven end of the rivet on the inside of the shell. The bracket *d* slips into the shoe forming the "*lug*."

We are informed that the driving of the rivets upon the inside insures tightness, as it admits of the wrought iron or steel of the boiler being drawn and hammered tightly against



the casting, whereas if the rivets were driven on the outside, no drawing could be done with the hammers, the shaping of the rivet only being all that is possible, which will generally leave a leakage past the head of the rivet and out between the metals.

The object of the arrangement is to admit of passing a boiler through a doorway through which it would not pass if the lugs were made in the ordinary way.

Baker, Smith & Co., we believe, are the first to use them, the boilers going into the building corner 28th street and 5th avenue being fitted with them; but Baldwin, in his work on steam heating, page 67, recommends them, and points out the objections to the old method.

Construction Notes.

BOSTON, MASS,—The Water Board will receive proposals until March 20, for cast iron water pipes for Cochituate Department; also for cast iron water pipes for extension of 48-inch mains. The estimate of quantities required is as follows:

First Contract—60 tons 10-inch pipe, Class A.; 600 tons 12-inch pipe, Class A.; 370 tons 8-inch pipe, Class B.; 300 tons 6-inch pipe, Class B.; 30 tons 4-inch pipe, Class B.; 80 tons special castings. Second Contract.—550 tons 48-inch pipe, Class A.; 90 tons 30-inch pipe, Class A.; 420 tons 24-inch pipe, Class A.; 150 tons special castings.

BROOKLYN.—The bill providing for the extension of Third avenue sewer, which has been signed by the Governor, is a work which is very much needed. The proposition it is to extend it from its present terminus at 28th to 43d street, down 43d to First avenue and thence to 49th street, where it will empty into the bay. The cost will be about $200,000 or $250,000, and will be paid by the city at large in the annual installments in the tax levy.—*Brooklyn Eagle, Mar.* 10.

KEENE, N. H.—The Springfield *Republican* says: "The sewerage question is likely to be a bone of contention in the new city government. A part of the members are opposed to the completion of the original plan, which they desire to give a trial, and then if found to be successful in the main street, through which it is now laid, to extend it to the smaller streets. Less than half the work laid out hy Col. Waring has been done. Other members of the council believe that the entire system should be completed, especially as the bonds have been issued and sold to pay for it, and as any attempt to reduce the amount of work would be resisted by the construction company, who have a contract for the entire system. The issue has not been squarely presented to the new city government and the result is doubtful.

LAFAYETTE, IND.—Proposals for low-pressure steam heating and ventilating apparatus including boilers, pumps, tanks, etc., for the new court house and for heating the jail will be received until April 18 at the auditor's office, of Tippecanoe County, in Lafayette, Thomas J. Barnes, auditor.

PORTSMOUTH, VA.—The contract for the water works, including buildings, pumps, conduit and distribution, has been given to John F. Ward, of Jersey City.

DURANGO, COL.—The Cincinnati and Newport Iron and Pipe Company, of Newport, Ky., have obtained the contract for furnishing cast-iron mains for the water works.

BUFFALO, N. Y.—Bids for furnishing the Water Department with cast iron pipe and special castings required for the year 1883, were opened March 3, as follows:

Lake Shore Foundry Co., Cleveland—	
Pipe per ton	$38.50
Special castings, per ton	70 00
Denin, Long & Co., Louisville, Ky.—	
Pipe, per ton, on cars	$36.75
Delivered on streets	1.04
Special castings, per ton	70.00
James Marsh & Co., Pittsburgh—	
Pipe, per ton	$39.00
Special castings, per ton	80.00
George B. Hayes, Buffalo—	
Pipe, per ton	$36.00
Delivered on streets	.50
Special castings, per ton	70.00
R. O. Wood & Co., Philadelphia—	
Pipe, per ton	$37.50
Delivered on streets	1.50
Special castings, per ton	70.00

George B. Hayes was awarded the contract. About 18 miles of mains will be needed this season. A contract for valve boxes was given to Bingham & Morgan, at 2¾ cents per pound.

HYDE PARK, ILL.—The Board of Trustees have authorized the President to sign the contract with Rust & Cooledge for the construction of a bridge over the Calumet River, at $26,500.

PHILADELPHIA, PA.—The Park Committee have awarded a contract to Cornelius Kennedy for the construction of a sea wall for the east side of the River Schuylkill, opposite the Lincoln monument, for $21.90 per lineal foot.

Girard College uses a good deal of water, and has been paying the city of Philadelphia about $700 per year for the fluid supplied by the Water Department of the city. Looking upon this as extravagant, the college is now experimenting on artesian wells. A boring has been made about 500 feet, at a cost of some $8,000. The yield of the well at last accounts was *at the rate* of 100,000 gallons per day, but it is not stated how long the pumping was continued. The boring is continued in the hope of getting a larger yield. It will not take much more expenditure to make the annual charge for interest on cost of the well and the expense of pumping exceed the yearly rental paid the city for water.

NEW YORK IN 1940.

North of the embankment run the great boulevards known as Gould avenue, Field avenue, and Vanderbilt avenue. The latter is wholly occupied by the North American Home Company, whose magnificent apartment houses built on the new glass plan, as it is called, extend a mile and a half from the embankment. These homes are all roofed in by glass, which gives the street the appearance of an immense crystal palace. The chief advantage of the glass system is, that the whole area is kept at an equable summer temperature all through the year. No fires are needed in the houses. Tropical trees bloom at all times, and tropical birds make the air melodious with their songs. The street is an immense sanitarium, and has drawn residents from all parts of the country who are tired of struggling with the vicissitudes of the American climate.

The men who have built superb mansions about Mount Morris, in the heart of the city, have, as a rule, been engineers and presidents of corporations. I ought to have told you that the principal executive officer of the city is an engineer. He is sometimes spoken of as the Governor, but his proper title is Chief Engineer. The present executive rose from a poor boy to be very wealthy. He made his first great success in bringing Putnam county and Rockland county air to the city in pipes and furnishing it to every resident at so much per cubic foot. The guests at the hotels are now able to order their air at the office before retiring. Companies have since been formed to lay on mountain air and sea air.

At this point the reporter managed to obtain breath enough to ask: "But what do they want with air when they build their apartment houses fifteen stories high? I should think they would get all the fresh air they wanted."

"But you must understand," said the professor, "that now they are building the houses air-tight. Exposure to the vicissitudes of the climate is an exploded weakness. The houses are hermetic, and the air let in and graduated to suit the taste and constitution. No fires are needed."

"They don't cook. That's an annoyance that they do not have. Food is furnished in pipes. Every thoroughly equipped house has its milk furnished by the Orange County Company, whose mains run direct from their dairies and reservoir; and the Consolidated Bouillon Co. furnish every variety of liquid food. The advantages in cleanliness, convenience, economy and health are incalculable. Everything is laid on. The Concentrated Food Co. has its pneumatic tube in every house. A dinner for ten can be put in your——"

"But," said the reporter, "I should think it would make them nervous to sleep so high up in the air."

"But they don't sleep," replied the Professor. "Don't you understand that sleep is only necessary to repair the waste of tissue and recuperate the system that is broken down by exhaustion?

"The New Yorker doesn't exhaust himself now. His system has not got to eliminate vast quantities of chaff. He doesn't yet tired out, and doesn't need sleep. It is exposure to the atmosphere and innutritious food that wear people out."

"But the gas must vitiate the air in a tightly sealed house."

"Gas!" exclaimed the Professor. "Why, there hasn't been a foot of gas burned in New York in thirty years. What do they want with gas when the houses are roofed with the vitreous translucent patents, and the whole city is lit with a central electric sun on Mount Morris? When the people want extra light they use solar light."

"Oh, come now, Professor, solar light at night is too good!"

"Is it possible," replied the Professor, "that you do not know that solar light can be stored up like electricity, or any other form of energy? Every house is supplied with one of Edison's accumulators, which will store in ten hours light equivalent to fifty candles. I was just going to call you attention to the Aluminum Belt Tramway, which is to run from the Brooklyn precinct over the Grand Street Bridge to the embankment, entirely by solar energy. The health of the city has been very much improved by the pipe system.

"What is that?"

"Why, when it became apparent that everything was to be brought through pipes, a shrewd capitalist formed a company, worked the Chief Engineer and got a charter to take up the city, move the dirt out from under it, and lay

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a solid foundation of iron pipes, that could be rented or let to the different corporations. Part of the city has been rebuilt in that way, and it has killed the miasm business. It is now proposed to roof in the whole of the Ninety-second precinct with glass.

"Would you like to know something about old New York?"

"No," said the reporter, "some other evening. What I have learned of the new will last me for a while."—*Morning Journal.*

At the meeting of the Engineers' Club of Philadelphia, the 3d inst.; Mr. W. S. Auchincloss described his latest forms of Averaging Machine, which is of interest to the engineering profession in its application to the location of engines, boilers and coal-bunkers in steamers, the determination of diameters of pulleys, speed of shafting and average haul of material.

Mr. J. J. de Kinder described the United States Metallic Packing for piston rods, valve stems, pump rods and throttles—exhibiting sections and model.

Col. William Ludlow has accepted the position of Chief Engineer of the Philadelphia Water Department, Congress having passed the bill granting him leave of absence for two years.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores; *b s dwell*, brown stone dwell; *apart house*, apartment house *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

39 Hester st, br ten, cost $15,000; o, Nathan Schancupp and Morris Goldberg; a, Wm. Jose....80 Morton st, br st ten; cost $14,000; o, John A. Frey; a, W. Graul; b, P. Christmann ...504 E 9th st, br and st ten; cost $13,000; o, Mecia Beggs; a, A. B. Ogden....319-321 E 44th st, 2 br stables; cost, ea, $2,500; a, R. Wirth, Jr; b, List & Lennon....106 59th st, n s, w av A, 4 br and br stone ten; cost, ea, $12,000; o, Andrew J. Kerwin; a, A. B. Ogden....81st st, n s, 100 e 2d av, 2 br st dwel; cost, ea, $13,000; agent, Wm. H. Johnson; a, A. B. Ogden ...70th st, s s, 249 w 1st av, 4 br st apartment houses; cost, ea, $15,500; o, Jacob L. Maschke; a, J. C. Burne; b, not selected....70th st, s s, 224 e 3d av, 6 br st ten; cost, ea, $16,000; o and c, same as last ....1st av, n e cor 63d st, br ten; cost $16,000; o, Sarah E. Hinman; a, J. H. Valentine; b, P. Lawler and T. C. Staples....1st av, e s, 25.5 n 63d st, 3 br ten; cost, ea, $15,000; a and b, same as last....126th st, n s, 325 e 7th av, 2 br st dwel; cost, ea, $13,000; o, Thos. Dunn.

ALTERATIONS, NEW YORK CITY.

79 John st, rebuilt wall in plans; cost $7,400; o, Felix Campbell; a, W. A. Mundell; b, C. Cameron, Wright & Brook....15 to 25 Whitehall st, add 3 stories, alter internally for office building; o, Robert Goelet; a, J. M. Dunn....48 Broadway, altered for offices; cost $6,000; o, M. J. Winthrop; a, H. J. Dudley....18 Spruce st, repair damage by fire; cost $11,000; o, Mrs. James Price; b, W. C. Hanna & Son....45 and 47 E 41st st, alterations; cost $2,500; o, Thomas L. James; a, J. B. Snook; b, A. A. Andruss & Son and D. Hepburn.... 240 E 15th st, br exten, alter to main b; cost $6,000; o, Communante Israelite Francaise; a, Wm. Graul....333 Spring st, c Washington, add 1 story, interior alter; cost $5,000; o, Mrs. M. J. Murray; a, J. C. Burns; b, not selected....4th av, s e cor 105th st br exten; cost $2,400; o, Fred P. Pfarr; a, M. L. Ungrich; b, not selected... 202-4 Mercer st, repaired; cost $3,000; o, Mrs. Hannah G. Gerry; a, J. B. Snook; b, A. A. Andruss & Son and D. Hepburn ...66th st, s s, 205 e 4th av, add 1 story, also exten; cost $4,000; o, Theo. Schumacher; b, J. Boekell.

BROOKLYN.

114 North 7th st, n s, Union av, 2 fr ten; cost, ea, $4,000; o, James Hennesy; a, E. F. Gaylor; b, M. Smith and D. Hough....Lewis av, s e cor Macon st, br st store and dwel, cost $7,000; o, A. S. Leonard; a and c, O. E. Hoffses; m, J. Ashfield & Son....19th st, s s, and 20th st, n s, 100 e 7th av, 2 fr stables; cost $4,500; o and b, same as last.... 3d st, s s, 144 e Hoyt st, br factory; cost $21,000; o, International Tile Co.; a, M. J. Morrill; b, P. J. Carlin and J. Lee....Marion st, s s, 125 e Saratoga av, 10 fr dwel; cost, ea, $1,000; o, John W. Russell; a and b, C. P. Skellon....State st, s s, 100 e Court st, br office and dwel; cost $5,000; o and b, George Litchfield; a, C. Werner....Rush st, n w s, 125 n e Wythe av, 2 br st dwel, cost, ea, $4,000; o, R. Taylor; a and b, J. H. Devoe....Tompkins av, s e cor Madison st, br st and dwel; cost $8,000, and 4 br dwel; cost, ea, $4,500; a, Paul C. Grening.

BROOKLYN ALTERATIONS.

683 Broadway, add two stories; cost $3,500; o, Wm. Andrews; a, Th. Engelhardt; b, G. Cutler and Henry Stocks....South 6th st, s e cor 1st, br exten; o and a, F. N. Wurster; b, W. and T. Lamb, Jr.

BALTIMORE, MD.,—Mount st, e s 7 br dwel; o, Jos. M. Cobee; b, Jos. M Cobee....Edmonson ave, w s, 25 br dwel; o, Jos. M. Cone; b, Jos. M. Cone....Harlem ave e s, 20 br bldg; o, same; b, same... Belair ave e s, 2 br bldg; o, B. Tilinan; b, B. Tilinan....Carey st w s, 10 br bldg; o, John Gleen Est....Castle st e s, 4 br bldg; o, Thompson & Stone; b, Thompson & Stone....Eagle st s s, 11 br bldg; o, Jacob Saum; b, Jacob Saum ...Fulton st w s, 15 br bldg; o, same; b, same ...Bruce ally e s, 20 br bldg; o, Geo. W. Moke; b, Geo. W. Moke....Bruce ally e s, 4 br bldg; o, Chs. F. Richter; b, Chs. F. Richter....Lorman st n s, 5 br bldg; o, same; b, same ....Mount st w s, 9 br bldg; o, same; b, same....Division st, 8 br bldg; o, L. H. Robinson; b, L. H. Robinson....20 ft. ally below Mount & Fulton st, 10 br bldg; o, B. Fear; b, B. Fear....Bruce ally w s, 12 br bldg; o, B. Fear & A. Homer; b, same....Fulton e s, 10 br bldg; o, same; b, same....Paca st, w s, 1 br w house; o, W. Hammond Jr.....Clement st, s s, 5 br bldg; o, B. F. Smith;.... Calhoun st, e s, 6 br bldg; o, John Keeper; b, John Keeper.... Prat st, s s, 8 br bldg; o, same; b, same ...Fulton st, 7 br bldg; o, Boston Bear; b, Boston Fear....Holliday & Center st, 1 br bldg; o, U. S. Electric Light & Co....Elliott & Hare st, n w cor. 1 br bldg; o, Cathe Leehey.

BOSTON, MASS.—1 Cazenore st, br hotel; o, Maria M. Brown; b, Holmes Bros....193 Marlboro st, br dwel; o, F. W. Chandler; b, M. C. Grant....Conant st, br brewery; o, Jas. McCormick; b, James M. Dewey...Houghton court, fr dwel; o and b, Louis Earle ....Lamartine st, fr mf'g; o, Wm. Drowne & Son; b, John F. Haines....27 and 29 Frothingham, fr stable and shed; o, S. R. J. Lombard; b, Thos. Stevens....Pier No. 4 Water st, fr storehouse; o, Hoosac Tunnel Dock & Elevator Co....Granite st, nr Richards st, fr warehouse; o, J. O. Whiting & Co.; b, M. W. Tate.... 330 Dorchester ave, fr smelting works, o, Vapor Fuel Co.; b, Clark & Lee....Frothingham ave, fr manf'g; o, Franklin Baldwin; b, Geo. W. Brown....Marginal st, nr Lewis st; fr storehouse: o, Boston Sugar Refining Co.; b, S. F. Whitehouse ...Chapman st, cor Rutherford ave, fr mechanical build; o, Elisha S. Hayes; b, N. F. Hanson ...Mechanic place, nr Mechanic st, fr stable; o, J. Frank Wadleigh....Brookside av, nr Green st, fr manf'g; o and b, Joseph P. Shaw....Clifton st, nr N. E. R. R., fr dwel; o, A. D. Gould....nr College st, fr dwel; o, A. D. Gould.

BUFFALO, N. Y.—13 West Eagle st, alter in dwel; cost $1,000; o, J. G. Miller; a, G. J. Metzger; b, E. M. Hager....Main, nr N. Division st, store; cost $8,500; o, M. Mesmer; a, G. J. Metzger.... Main, nr N. Division st, store; cost $9,500; o, S. J. Birdsall; a, G. J. Metzger....395 Ellicott st, veterinary hospital, cost $7,000; o, N. P. Hinkley; a, G. J. Metzger.

CINNCINNATI.—Richmond nr Mound sts, st front; cost $10,000; o, E. Moch; b, E. Moch....Cor Liberty and Central avs, br dwel; cost $10,000; o, Fred. Herle; b, Fred. Qucke....Pearl and Race sts, br dwel; cost $6,000; o, Thos. Emery's Sons; b, Thos. Emery's Sons....Park av nr Locust, br dwel; cost $8,000; o, Gordon; b, Stephen Richards.

CHICAGO.—In Douglas Park, fr refectory; cost $9,000; o, the city; a, J. M. Vanosdel, b, the city....Rhodes av and College place, 3 br and fr dwel; cost $14,000; o, F. Crumbough; a, Wheelock & Clay; b, not decided....Ogden av nr Harrison, double br dwel; cost $6,000; o, Wm. Schutle; a, B. W. S. Clark; b, W. H. Thomas ....Indiana av nr 18th st, st residence; cost $25,000; o, J. J. Simmons; a, Wheeler & Clay; b, not decided....Indiana av nr 32d st, residence in Lake Superior sandstone and Philadelphia green stone; cost $35,000; o, J. E. Morris; a, Wheelock & Clay; b, not decided... Van Buren nr Laflin sts, br flats; cost $12,000; o, Mr. Ward; a, Mr. Halberg; b, not decided....Rhodes av nr 22d st, st and br dwell; cost $10,000; o, J. Foster Rhodes; a, Mr. Halberg; b, Wm. addell ...Winchester av nr Adams, br and st dwel; cost $11,000; o, Louis Lloyd; a, Mr. Halberg; b, Geo. Peterson... Harrison st nr Laflin, 2 br dwel; cost $12,000; o, Mr. Gregg; a, Mr. Halberg; b, O'Connell & McGinnis....651 Ashland av, br dwel; cost $5,000; o, Jesse B. Blank; a, none: b, owner ....126-136 Curtis st, br factory; cost $15,000; o, L. Hanson; a, C. O. Hanson; b, A. Carlson ...137-139 Hoyne av, br add to keg factory; cost $6,000; o, Seaman, Cox & Brown; a, none; b, Jas. S. Price ...655 Halstead st, br store; cost $6,000; o, A. C. Baumann; a, none; b, F. Kerchott....Belden av nr Clark st, br dwel; cost $7,000; o, Estate of D. Himrod a, Hy. Starbuck; b, not decided....528 W. Madison, br store and dwel; cost $8,000; o, Robt. Fish... S.e. cor La Salle and Ontario avs, br factory; cost $15 000; o, F. T. June; a, Ed. Baumann; b, Mueller & Scheel ...252-252 S. Halstead st, br store and dwel; cost $20,500; o, P. H. Mathei; a, H. Sierks; b, Rossler & Winckler....101 E. Indiana av, br store; cost $20,000; o, David Tubino; a, Shipman; b, not decided ....Garfield av nr Burling, st dwel; cost $5,000; o, M. C. Carroll; a, E. H. Frohmann; b, Rossler & Weinfen.

DENVER, COL.—Holliday st, br stores; cost, $12,000; o and a, W. H. Lyon... .South 15th st, br dwel; cost, $8,000; o, W. Feldhauser; a, R. Roeschlaub....South 14th st, br dwel; cost, $12,000; o, Mrs. W. Byers; a, Edbrooke & Burnham....16th st, br stores: cost, $9,000; o, F. R. Eastman; a, W. H. Littlefield....Penn av, br dwel; cost, $5,000; o, L. R. Foote; a, E. P. Varian....West Denver, br mill bld; cost, $14,000; o, P. Mullin; a, Millwright....16th st, br stores; cost, $5,300; o, Clifton Bell; a, F. E. Edbrooke & Co....cor 16th and Larimer st, alterations br store; cost, $6,000; o, J. Cooper; a, W. H. Litttlefield.

DUBUQUE, IA.—660 Locust st, 3 br dwel; cost, $10,000; o, W. H. Peabody; a, F. D. Hyde; b, not let

ENGLEWOOD, ILL.—Wentworth av and Sixty-eighth st, Queen Anne fr dwel; cost $5,000; o, F. A. Adams; a, B. W. S. Clark; b W. W. Bradley.

HYDE PARK, ILL.—Cor. of Ellis av and Fortieth st, rendered in rock-faced artesian well stone; cost some $30,000; o, Chas. Merriam; a, Wheelock & Clay; b, not decided....Br h with st trimmings; cost $10,000; o, G. H. Bell; a, Halberg; b, S. E. Morse.

KANSAS CITY.—Harrison lots 1 and 2, br; cost, $8,000; o, J. J. Kennedy ...501 Delaware st, alt; cost, $8,000; J. Field. There has been considerable amount of building contemplated, but as yet nothing definite is determined.

LAKE VIEW, ILL.—Br school; cost some $18,000; o, Lake View town; a, F. Baumann; b, not decided.

OAK PARK, ILL.—Fr dwel; cost $7,000; o, Mr. Williams; a, B. W. S. Clark; c, not let.

OGDENBURG, MALONE, N. Y.—Contractor for new Presbyterian Church is Mr. Orville Moore, of Canton, N. Y., at $41,000.

PHILADELPHIA, PA.—Meehan, e of Musgrove, three dwell; b, W. Garvin....2d, s of Queen, Police Station; b, Jos. W. Pattison... Washington ab Fountain st, dwell; b, McIlvaine & Cunningham ....11th, n of Huntingdon, 20 dwell; o, Jos. D. Thornton and Jas. H. Harper....11th and Huntingdon, store and dwell; o, same as last..11th and Oakland sts, store and dwell; o, same as last ...Christian, e of 24th, ten dwell; o, Chas. Lafferty....Poplar, e of 27th, four dwell; o, Matthew Fleming....Thompson, s of Neff, six dwell; o, Chas. Judge....Ann, w of Thompson, four dwell; o, Chas. Judge....1330 Palethorp st, dwell; b, Shegog & Quigley ....6th n of Lehigh av, four dwell; o, Benard Gum....12th, s of Montgomery av, dwell; b, H. A. Miller....Kensington av, n of Adams, store and dwell; o, Julia Russell ..Kensington av, n of Adams, store and dwell; o, J. McCain....1521 Vine st, dwell; o, W. D. Dower... Wilder, bet 19th and 20th, three dwell; o, T. Gallagher....1229 Germantown av, dwell; o, Phillip Muller.... 1228 Cadwalager, dwell; o, same as last....Braddock, bet 24th & 25th, eight dwell; o, Louis Engle....Waterloo, n of York, dwell; b, Jas. McCartney....736, 738, 740 Enew, dwell; b, H. Gaston.... Orkney, s of Somerset, dwell; b, J. Cairns... 5th, s of Somerset, dwell; b, same as last... 121 N 13th, add'n; b, Jas. H. Howard & Co.....16th above Indiana av, slaughter house; b, John Mitchell.

RENFREU, ONT.—Presbyterian Church; cost, $13,000; contract not let; a, J. P. Johnston.

SIOUX CITY, IOWA.—Higman's addition dwel; cost $8,000; o, E. C. Higman; a, Correys Loft; b, A. C. Cox.

WASHINGTON, D. C.—G st bet 26th and 27th, br engine room; cost $5,000; o. and b, Washington Gaslight Co....2nd bet B and C sts, 3 br dwels; cost $6,000; o, Jas. L. Grerman; a, N. F. Haller; b, Stevens & Frye...S E cor 8th and 2nd sts, 6 br dwels; cost $11,000; o, Thos. E. Waggaman; a and b, F. W. Kerr... 14th st bet R, I and P sts, br dwel; cost 5,000; o, Jno. W. Nairn; a, Jas. McGill; b, Wm. C. Morrison ...9th st bet D and E sts, br dwel and store; cost $20,000; o, M. W. Beveridge; a, Gray & Page; b, W. C. Morrison ..N st bet 17th and 18th sts, dwel, mansard with basement; cost $8,000; o, Dr. O Kie; a and b, R. Stead.... Pierce st bet 15th and 16th sts, 6 br dwels; cost $12,000; o, a and b, Jas. Robbins.

WHEELING, W. VA.—8th ward, br church; cost $15,000; o, Presbyterian Association; a, S. M. Howard....Front st, proposed brick residence; o, J. Pollack; a, S. M. Howard....Main st, proposed br warehouse; o, J. Spridel; a, S. M. Howard....Market and Sixth, br residence; cost $7,000; o, C. Hanes; a, Hanes, Wilson & Co....South Front, fr residence; cost $5,000; o, Holliday; b, Holliday & Co.

MISCELLANEOUS.

BOSTON, MASS.—A story is to be added to the United States Hotel at a cost of $100,000.

CHICAGO, ILL.—Architects Burling & Whitehouse have planned a $50,000 residence on Michigan avenue, for Mr. C. T. Yerkes. Messrs. Burling & Whitehouse are also the architects of three houses to be built this spring on La Salle avenue, near the corner of Oak street, for Mr. Kirkwood, the cost to be $30,000. The same gentlemen have planned a warehouse, 150 x 145 feet in dimensions, at Milwaukee avenue and Fulton street. The cost will be $55,000. They are also making plans for Mr. Swartz's new building on Madison street. Cost about $40,000. Architect George O. Garnsey has planned for Thomas Welsh a block of flats at the corner of Dearborn and Thirtieth streets, the material being brick and stone. Mr. Genung has drawn plans for the proposed morgue, to cost $12,000.

COLUMBUS, OHIO.—Among proposed new bulldings are the following: Allen C. Ady, two two-story brick dwellings, Warren street; cost $2,500 each....A Schwarz, three-story brick business block, West State street; cost $5,000.

INDIANAPOLIS, IND.—The council has determined to erect a city hall, to cost $150,000; architects, J. H. & A. H. Stern; dimensions 249 feet by 194 feet, two stories and basement.

MONTREAL, CANADA.—Two public baths to be erected are to be built from plans and specifications drawn by Mr. J. A. U. Baudry.

SAVANNAH, GA.—The contract for rebuilding the Butler Female College, recently burned, will be soon given out. The building is to be 60 x 70 feet and is to cost $70,000.

TROY, N. Y.—G. A. Stone will erect a brick dwelling on Second street; D. Little a brick flat on Congress street; cost $6,000.

THE NEW ORLEANS AUXILIARY SANITARY ASSOCIATION.

At the meeting of the New Orleans Auxiliary Sanitary Association held on Feb. 16, the President, Mr. Edward Fenner, delivered an able address reviewing the history and objects of the Association. This address is printed in full in the New Orleans *Times Democrat* of Feb. 19, and we select a few extracts. After an account of the organization of the Association at the termination of the epidemic of 1878, and of the Sanitary Council of the Mississippi Valley, he referred to the reports published by the Sanitary Commission which investigated the condition of New Orleans after the epidemic of 1853, saying:

"They are very voluminous. The researches were thorough—the conclusions arrived at in strict accordance with the added knowledge of sanitary and hygienic methods gained during the past quarter of a century. Nevertheless we do not believe that one citizen in a thousand has ever read these reports. They are out print, and this association is indebted to the editor of the German *Gazette* for the use of a copy.

"*We do know that their labor was all in vain.* Nearly thirty years were permitted to elapse before any adequate number of citizens volunteered to devote a portion of their time to the onerous but transcendent duty of making practical application of the invaluable sanitary suggestions of these commissions.

"No city can attain to the highest degree of prosperity in which there are not some wise and good men to teach, and other men to learn—nay more, what city can hope to prosper, in any degree, that is given over by its own citizens to those who make office-holding the profession of their lives? What avails an expressed devotion to State or city if we permit their affairs to be under the sole control and management of those who very frequently are least interested in their material prosperity?

"The experience of the past teaches us that other methods must be adopted than those we have supinely assented to, would we prevent any interruption to the good health and rapid recovery from the almost moribund condition of this city four years ago.

"What but the dread of yellow fever has prevented the more rapid growth of New Orleans? Who will gainsay the assertion that every epidemic retards our progress for years?

"In the past an immense territory was tributary to this city; events which we were unable to control, have worn new channels of trade. How to supplement this lost supremacy should now be our chief concern."

Extensive quotations are then given from the report of the Sanitary Commission published in 1854, much of which is applicable to-day, and the address closes by summarizing the improvements which have been effected in drainage, removal of garbage, flushing of gutters, etc., under the auspices of the Association. We are glad to learn that the address is to be printed in a cheap popular form and widely circulated.

Mr. Fenner and his associates are taking the right road to promote the commercial interests of New Orleans, and should be supported by her citizens in their work.

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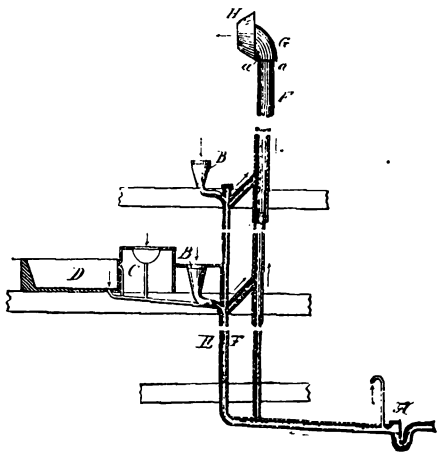
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

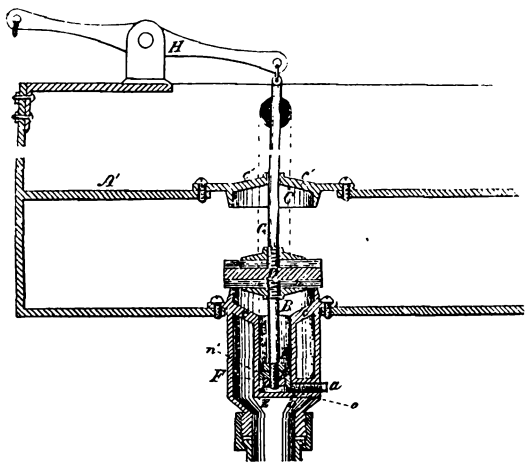
[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

266,438. VENTILATING PIPE AND COWL. JOHN COOPER, Boston Mass. Filed Jan 3, 1882. (No model.) Issued October 24, 1882.



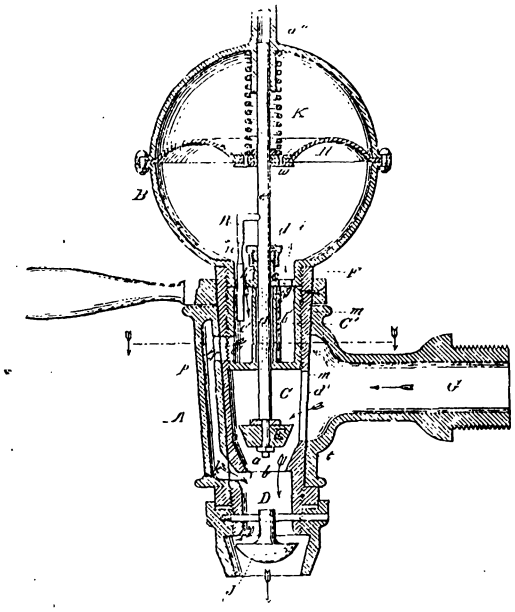
Claim.—A ventilating pipe, F, increasing in size toward the top, in combination with the cowl G, of greater diameter than the pipe F, and having the base plate *a* and the guard H, substantially as described.

266,434. SUPPLY TANK FOR WATER CLOSETS. JOHN COOPER, Boston, Mass. Filed Dec. 24, 1881. (No model.) Issued October 24, 1882.



Claim.—A double faced valve having two seats, one of the seats inverted and placed above the valve, in combination with a cylinder, plunger, check-screw, and air-port, substantially as and for the purposes set forth.

266,484. FAUCET. TOLBERT LANSTON, Washington, D. C. Filed June 2, 1882. (No model.) Issued Oct. 24, 1882.



Claim.—1. A faucet having, in connection with a water chamber a diaphragm therein and a check valve connected to said diaphragm an outlet passage leading from said chamber, and an inlet passage leading thereto from the seat of the turning or hand valve, substantially as specified.

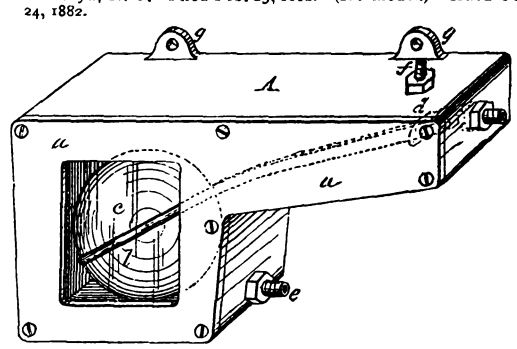
2. A faucet having a main water passage or outlet and a secondary independent water passage, combined with the diaphragm chamber and the stop valve, the secondary water passage connecting said diaphragm chamber with the main water way beyond the seat of the stop valve, substantially as set forth.

3. In a faucet, the combination, with the chamber B, diaphragm H, and reciprocating stop valve E, of the hand valve F, valve chamber C, water passages, and the slide check R, substantially as specified.

4. A faucet having independent of the main water way a secondary water way through a diaphragm chamber, and an accelerating drip check rod in the outlet from said chamber, connected to the stem of a stop valve which is attached to the diaphragm in said diaphragm chamber, substantially as specified.

5. A faucet having a positive automatic cut-off or stop for the flow arranged in the main water way, and inclosed so as to be beyond the control of the operator, substantially as specified.

266,485. WASTE OR SEWER TRAP. COLIN LIGHTBODY, Brooklyn, N. Y. Filed Feb. 25, 1882. (No model.) Issued Oct. 24, 1882.



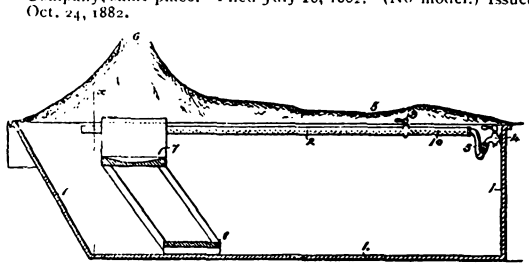
Claim.—1. The combination, with the trap, of an inclosed tank inclosing a float valve, and placed on a level with the sealing bend of the trap, or nearly so, having the base of its water chamber communicating with the sealing bend of the trap, its float valve connected with the water supply, and a suitable air vent opening from the top or air chamber of the tank, substantially as and for the purpose set forth.

2. A new article of plumbers' ware adapted for ready connection to traps, consisting of a detached and inclosed tank inclosing a float valve, with the neck of the valve opening or projecting from the exterior of the tank, and with an aperture or nipple opening from the base or water chamber of the tank, and a vent aperture or air vent nipple opening from the top of the tank, and the whole adapted to be connected with the plumbing of a house, substantially as and for the purpose herein set forth.

3 The combination, with a trap, of an inclosed tank, A, arranged on a level therewith and inclosing a float valve, with a communicating pipe, *h*, extending from the base of the tank to the base of the trap, a water supply pipe, *k*, connected with the float valve, and an air vent pipe, *i*, extending from the top of the tank to the top of the trap or its equivalent, substantially as and for the purpose set forth.

4. An inclosed tank formed in a recumbent L shape and inclosing a float valve, with external connections adapted to connect with a trap, substantially as herein shown and described.

266,531. BATH TUB. WILLIAM W. ROSENFIELD, New York, N. Y., assignor to the Portable Hygienic Vapor and Disinfector Company, same place. Filed July 26, 1882. (No model.) Issued Oct. 24, 1882.



Claim.—1. The combination, with an ordinary bath tub, of a flexible cover, as 5, provided with an opening, as 6, a perforated pipe, as 2, and means for connecting the same with the hot water cock, substantially as described.

2. The combination, with an ordinary bath tub, of the longitudinal perforated pipe, as 2, provided with a cock, as 9, for shutting the water off from a part of its length, substantially as described.

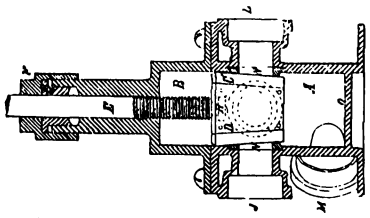
3. The combination, with an ordinary bath tub, of the flexible cover, as 5, provided with the opening, as 6, the perforated pipe, as 2, and means for detachably connecting the same to the hot water cock, substantially as described.

4. The combination, with an ordinary bath tub, of a flexible cover, as 5, provided with an opening, as 6, a perforated pipe, as 2, and a removable seat and foot rest, as 7 8, substantially as described

5. The combination, with an ordinary bath tub and its hot water cock, of the perforated pipe, as 2, flexible connecting pipe, as 3, nipple, as 11, plain annulus, as 13, and annulus, as 16, substantially as described.

6. The combination, with an ordinary bath tub and its hot water cock, of the perforated pipe, as 2, flexible connecting pipe, as 3, and means whereby the flexible pipe is coupled directly to the cock, substantially as described.

266,664. STOP-VALVE FOR WATER AND GAS. FREDERICK C. VINEY, Philadelphia, Pa. Filed Jan. 16, 1882. (No model.) Issued Oct. 31, 1882.



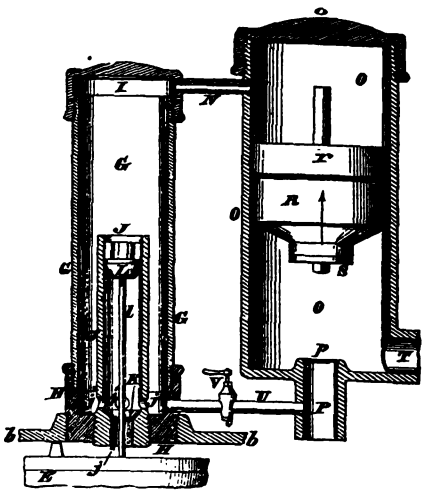
Claim.—1. A tapering valve-plug having several sides, and the vertically-movable valve-stem fitted to the head of said valve-plug, in combination with valve-seats N, formed of circular cavities filled with soft metal to correspond with the tapered sides of said plug, and outlets or passages covered by said valve-plug and corresponding in number and location with the sides thereof, substantially as set forth.

2. A vertically-movable valve-stem and the tapering valve-plug having several sides, each side covering a separate passage or outlet, in combination with removable hard-metal plates fitted to said sides, and valve-seats N, constructed to fit the tapering shape of the sides of said valve-plug, substantially set forth.

266,670. WATER-CLOSET VALVE. EMIL MOELLMANN, Cincinnati, Ohio, assignor of one-half to John G. Murdock, same place. Filed Sept. 4, 1882. (No model.) Issued Oct. 31, 1882.

Claim.—1. The chamber O, having an outlet, T, and an inlet, P, which latter is opened and closed by an automatic valve, as R S, said chamber and inlet communicating respectively by the pipes N and U V with the vessel G, whose wasteway *j* is opened by some of the operating appliances of the water-closet, substantially as herein described, and for the purpose set forth.

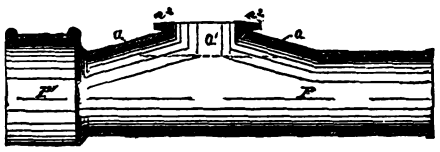
2. In combination with the vessel G, communicating by pipes N U V with the cylinder O P T, traversed by the automatically-acting valve R *r* S, in the manner described, the wasteway *j*, closed with the plug L, which latter is operated by the discharge-valve E of the closet, as herein described.



3. The vessel G, communicating with the valve-chamber O in the manner described, said vessel being screwed into the thimble H, with which latter is engaged the perforated guide-tube Jj^1, provided with the wasteway *j*, for the purpose described.

266,809. DRAIN AND SEWER. HENRY R. GREENLEAF, Boston, Mass. Filed May 26, 1882. (No model.) Issued Oct. 31, 1882.

Brief.—A section of the pipe is made gradually enlarged up to the covered aperture to facilitate cleansing.



Claim.—The section of drain or sewer pipe P, having the upward inclines *a a*, the aperture a^1, and the flanged seat a^2, as shown, combined with the cover *b* and securing means, and the whole adapted to serve as and for the purposes set forth.

266,408. FLOOD-GATE. HENRICH VOELMI, New York, N. Y. Filed Apr, 24, 1882. (No model.) Issued Oct. 24, 1882.

266,430. FLOOD FENCE AND GATE. JOSIE A. CLARK, Locust Grove, Ohio. Filed May 25, 1881. Renewed July 22, 1882. (Model.) Issued October 24, 1882.

266,446. ADJUSTABLE BRACKET FOR HEATING PURPOSES. JOHN H. EAGER, New Orleans, La. Filed July 19, 1882. (Model.) Issued October 24, 1882.

266,457. ARGAND LAMP. JOSEPH FUNCK, Tompkinsville, N. Y. Filed Sept. 6, 1882. (No model.) Issued October 24, 1882.

266,462. VENT-VALVE. EDWARD F. GORDON and Horatio Hobbs, Concord, N. H. Filed May 26, 1882. (No model.) Issued October 24, 1882.

266,478. DEVICE FOR BURNING CRUDE OIL IN STOVES AND FURNACES. JOSEPH F. IRONS, Bradford, Pa. Filed July 3, 1882. (No model.) Issued October 24, 1882.

266,506. STEAM HEATING APPARATUS. EUGENE F. OSBORNE, St. Paul, Minn. Filed Oct. 31. 1881. Renewed Sept. 14, 1882. (No model.) Patented in France Jan. 4, 1881, No. 140,479; in Germany Jan. 4, 1881, No. 15,588; in Belgium Jan. 5, 1881, No. 53,407, and in England Oct. 17, 1882. Issued Oct. 24, 1882.

266,510. LAMP. HENRY PEIGNIET, Paris, France. Filed Aug. 14, 1882. (No model.) Patented in France Oct. 11, 1881, No. 145,260; in England Feb. 9, 1882, No. 630, and in Belgium May 19, 1882, No. 57,962. Issued Oct. 24, 1882.

266,538. FORCE PUMP. GEORGE W. SIMONS and ROBERT H. GEBOTT, St. Catharines, Ontario, Canada; said Simons assignor to said Gebott. Filed April 18, 1881. (Model.) Patented in Canada Nov. 27, 1880, No. 12,031. Issued Oct. 24, 1882.

266,541. GAS BURNER GAGE. DEXTER M. SMALL, Providence, R. I. Filed July 9, 1881. (No model.) Issued Oct. 24, 1882.

266,542. GAS BURNER GAGE. DEXTER M. SMALL, Providence, R. I. Filed Oct. 29, 1880. (Model.) Issued Oct. 24, 1882.

266,543. GAS TEST AND PRESSURE GAGE. DEXTER M. SMALL, Providence, R. I. Filed Mar. 13, 1882. (No model.) Issued Oct. 24, 1882.

266,546. CAR VENTILATION. MARSHALL B. STAFFORD, New York, N. Y. Filed July 1, 1882. (No model.) Issued Oct. 24, 1882.

266,549. ELECTRICAL FIXTURE. LUTHER STIERINGER, New York, N. Y. Filed June 14, 1882. (No model.) Issued Oct. 24, 1882.

266,550. ELECTRIC LIGHT CHANDELIER. LUTHER STIERINGER, New York, N. Y., assignor, by direct and mesne assignments, to himself and Charles F. Harrington, same place, and Richard N. Dyer, Menlo Park, N. J. Filed Dec. 27, 1881. (No model.) Issued Oct. 24, 1882.

266,559. PERCOLATOR FOR ROSIN. CHARLES C. TYLER, New York, N. Y. Filed Sept. 27, 1882. (No model.) Issued Oct. 24, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MARCH 3d, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	9	13.0	2	22.2											1							
Boston.....Mass	407,581	171	21.3	51	29.8	3	2	32	4	8	11		2		3	16		8	1		1		
Cambridge.....Mass	57,432	25	22.4	5	20.0	1		3			2				1	1		1					
Worcester.....Mass	64,995	21	16.6	4	19.0			4								1		1			1		
New Haven.....Conn	66,979	29	22.4	11	37.9			2			2	1	1			7		2			1		
Providence.....R. I.	116,755	34	15.1	6	17.6	2		5		2			1			6							
Total	748,261	289	19.7	79	27.3	6	2	46	4	10	15	1	4		4	32		12	1		3		
EASTERN CITIES.																							
Albany.....New York	98,430	38	19.7	12	31.5	2	2	7	2		1				1	1	1	2		1	1		
New York.....New York	1,299,249	719	28.6	268	37.2	24	5	92	12	14	24	4	8	7	14	110				20	6	1	6
Brooklyn.....New York	633,763	279	22.9	112	40.1			41	11	6	8	1	3	1	9	33	1	19	1		7		6
*Hudson Co.....New Jersey																							
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	24	22.9	9	37.5	1		5		2						3							
Paterson.....New Jersey	58,324	19	16.6	6	31.5	1		3	1		1					1		2			1		
Philadelphia.....Pa.	907,043	404	22.9	135	33.4	5		61	9		20	1	13	1	7	30	8	12				6	2
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	23	25.5	9	39.1			2		1						1						2	
Total	3,097,710	1,507	25.0	551	36.4	33	7	211	35	23	54	6	24	9	31	179	10	35	1	21	15	9	14
LAKE CITIES.																							
Buffalo.....New York	168,702	74	22.4	28	37.8	2	1	12	2		2	3	3		7	7	3	3			1	1	
Rochester.....New York	92,116	30	16.6	5	16.6	2	1	8			1	2		1		2		1					
Syracuse.....New York	54,696	20	18.7	4	20.0			2	1	1					2	3							
Cleveland.....Ohio	192,084	72	19.2			1	3	7	5		6		2			4	3	1			1		1
Detroit.....Michigan	131,118	31	11.9	17	54.8			2	2		1				1	4		2			2		
Chicago.....Illinois	597,834	229	19.7	96	41.9	10	5	19	7	2	6	3		2	7	24	2	12	3		9	1	
Milwaukee.....Wisconsin	135,233	45	17.1	25	55.5	1		2	2		4	1	1			2		2	1				
Total	1,371,783	501	18.7	177	35.3	16	10	52	19	3	20	9	6	3	17	46	8	21	4		13	2	1
RIVER CITIES.																							
Allegheny.....Pa.	89,038	29	16.6	15	51.7	3		4	1	1		1	1		1	3		1		1			1
Pittsburgh.....Pa	191,523	65	17.1	20	30.7	3	2	10	1	1	1		6			6		4		1	1	3	3
Cincinnati.....Ohio	267,767	165	31.7	60	36.3	4	4	26	2	2	4	5	2		7	23	3	5		2	3		9
*Dayton.....Ohio	47,648	8	9.8	3	37.5					1			1						1				
Louisville.....Ky.																							
Indianapolis.....Indiana	86,529	35	20.8	10	28.5		1	11		1			2			4	1						
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	28	14.5	11	39.2	2		2	2		2		1	1		2	1	2			2		
*St. Paul.....Minn																							
St. Louis.....Mo.	362,816	159	22.4	54	33.9	3	2	20	3	5	5			5	8	19		10			2		
Total	1,137,347	489	21.8	173	35.5	15	8	73	9	11	12	6	13	6	16	57	5	22	1	4	8	3	13
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.. Wh.	136,471	49	18.2	9	18.3		1	5	1	1	1		2		2	7		1			2		
" " Col.	71,103	47	34.3	27	57.4			11								8	1	4					
Richmond, Va. Wh.	38,526	11	14.5	4	36.3			2									1						
" Col.	29,394	25	44.2	11	44.4	1		6		1						2		1					
Charleston S. C. Wh.	22,699	4	8.8	1	25.0						1					1							
" Col.	27,595	25	46.8	10	40.0			7								2							
Atlanta Ga. Wh.	25,583	3	5.7	1	33.3																	1	
" Col.	19,221	8	21.3	2	25.0			3															
Savannah Ga. Wh.	15,041	10	34.3				2	2													1		
" Col.	16,506	15	46.8				1	2								2							
Nashville Tenn. Wh.	31,993	10	16.1	3	30.0			2							1							2	
" Col.	19,406	16	42.7	6	37.5			2								3						1	1
Memphis Tenn. Wh.	18,677	9	25.0	1	11.1			2						1									
" Col.	14,896	20	67.7	5	25.0			5		1						6							1
*Mobile.....Ala. Wh.																							
" Col.																							
*New Orleans.....La. Wh.																							
" " Col.																							
Total White	288,990	96	17.1	19	19.7		3	13	1	1	2		2	1	3	8	1	1			3	3	
Total Colored	198,141	156	40.6	61	39.1	1	1	36		2						23	1	5				1	2
Total in 34 U. S. Cities	6,842,192	3,038	22.9	1,060	34.8	71	31	431	68	50	103	22	49	19	71	345	25	96	7	25	42	18	30
Summary for 5 weeks, ending March 3	6,918,722	14,499	21.7	4,794	33.0	367	126	2,123	319	214	526	104	241	125	509	1,632	127	433	29	106	182	203	145
Feb. 17,—Total in 28 English Cities	8,620,975	3,611	21.9			161				29	23		74		76					30		9	100
Feb. 17, " 8 Scotch Cities	1,233,088	611	25.8			23				10	12		8		12			165		7			46
Feb. 17, " 16 Irish Cities	854,731	588	35.8			4		64		10			5		12			183		2			27
Jan. 27, " 166 German Cities	8,356,524	4,265	26.5	1,859		89		629	35	124	155		49		80			421		36	14	1	74

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

For the week ending March 3d of an urban population of 6,842,192 there died 3,038, which is equivalent to an annual death rate of 22.9 per 1,000, an increase over the preceding week for which it was 21.3; 14.1 per cent. of the total mortality was due to consumption, 11.3 per cent. to pneumonia and 3.3 per cent. to diphtheria.

For the North Atlantic cities the death rate was 19.7; for the Eastern cities 25.0; for the lake cities 18.7; for the river cities 21.8; and in the Southern cities, for whites 17.1, and for colored 40.6 per 1,000.

For the five weeks ending March 3d the mortality rate for an average urban population of 6,918,722 was 21.7, that for the preceding four weeks having been 21.8.

During this period of five weeks ending March 3d the average death rate in the North Atlantic cities was 20.8; in the Eastern cities 23.4; in the lake cities 18.2; in the river cities 20.3; in San Francisco 18.7; and in the Southern cities, white, 20.8; colored, 34.3 per 1,000. These figures may be compared with those for the month of January given in the notes on page 277 of THE SANITARY ENGINEER for February 22, 1883.

During these five weeks diphtheria caused 4.4 per cent. of all deaths in North Atlantic cities; 3.5 per cent. in Eastern cities; 5.7 per cent. in the lake cities; 3.6 per cent. in the river cities, and 2.1 per cent. among whites in Southern cities. Consumption caused 16.1 per cent. of all deaths in North Atlantic cities; 15.4 per cent. in the Eastern cities; 9.8 per cent. in the lake cities; 14.2 per cent. in the river cities; 9.8 per cent. in San Francisco; 15.2 per cent. among Southern whites, and 18.9 per cent. among the Southern colored urban population.

NEW YORK CITY LUNATIC ASYLUM.—Dr. T. M. Franklin, Medical Superintendent, reports for the week six admissions, six discharges, one death, and 1,332 insane patients remaining under treatment.

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TABLE SHOWING DEATHS IN TWENTY-THREE CITIES OF THE UNITED STATES FOR THE MONTH OF JANUARY, 1883.

CITIES.	STATES.	Total Population.	Total Number of Deaths.	Representing an Annual Death rate per 1,000 of—	Number of Deaths under Five years.	Number of Deaths over Sixty years.	Males.	Females.	Accidents.	Cerebro-Spinal Meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal Diseases.	Small-Pox.	Whooping-cough.	REPORTER.
Chicago	Ill	560,693	966	20.67	428	104	503	463	43	20	99	31	6	73	5	22	6	39	81	9	55	1	1	19	13	7	Dr. M. K. Gleason.
District of Columbia	White	126,300	182	17.29	127	70	111	71	9		36	1		3		2	4	13	13	7	4						" S. Townshend.
" "	Colored	65,680	157	28.68			71	86	5		36		1	3	1	3	1	1	23	6	5					1	
Evansville	Ind. White	26,565	38	17.16	26	9	47	20	2		6			1		3			3		1						" E. S. Elder.
"	" Colored	2,712	29	128.24					1	1	3		2			1			2						6		
Hudson Co.	N. J.	203,681	419	24.70	176	66			19		62	17	3	21		1	3	23	54	4	29	1	2	2		1	C. J. Rooney, Jr.
Keokuk	Iowa	15,000	14	11.20	10	3	6	8	1										1				1				Dr. G. F. Jenkins.
Knoxville	Tenn. White	12,643	22	20.88	6	2	14	8			1	1		1	1	2					1		1		5		" S. B. Boyd.
"	" Colored	4,508	19	50.57	10	1	13	6	1		1								2				2		4		
Macon	Ga. White	9,000	14	18.66	5	2	9	7			2						3		1								Dr. J. E. Blacksheur.
"	" Colored	8,000	15	22.50		3	6	7			1						3		1								
Milwaukee	Wis.	130,000	214	19.80	99	32	118	96	14	2	17	8		8	4	3		8	15	3	6						" R. Martin.
Minneapolis	Minn.	80,000	118	17.70	51	12	66	52	7	5	7	3		14	3	5		1	8	4	6			2	3	1	" J. C. Cockburn,
Mobile	Ala. White	16,927	28	19.80	13	13	14	14	1		8					1	1		2								" E. H. Fournier.
"	" Colored	14,368	31	25.90			16	15		1	5								3		2						
Nashville	Tenn. White	32,000	58	21.46	11	17	35	23	3		10	1	1	1	1	1			10	1					4		" R. Cheatham.
"	" Colored	18,000	45	29.70	19		15	30	3	1	13								5						3	1	
New Haven	Conn.	72,000	137	22.70	44	28	67	70	1		22			5		3	2	4	8		9		5	4		10	Dr. C. A. Lindsley.
Norfolk	Va. White	12,546	20	19.20	3	5	11	9	1		6								3								" Jas. D. Galt.
"	" Colored	10,454	31	35.50	12	7	15	16	1		3					1			4		1						
Oakland	Cal.	36,000	47	15.67	17	5	24	23	2	1	4		1	2		1	1	2	6		2		1				" J. R. Bradway.
Paterson	N. J.	55,000	95	20.70	36	16	50	45	1		14	3	1	1				3		9					1		" Geo. Boyd.
Petersburg	Va. White	10,000	18	21.60	3	4	9	9			4	1							3								" P. S. Schank.
"	" Colored	12,000	29	29.00	12	6	14	15	1		4	2							2		2						
Providence	R. I.	116,755	217	22.30	60	51	104	113	7	1	30	7	4	6		15	1	2	27	2	5	2		1	1	1	" E. M. Snow.
Richmond	Va. White	40,000	59	17.70	42	33	26	33	1	1	8	1	2			2			5	1	2					1	" J. G. Cabell.
"	" Colored	28,000	90	38.57			48	42	1	2	18	1				1	2	1	10	2	1					1	
Rochester	N. Y.	100,000	126	14.80	29	25	74	52	4		33	2	1	5		8	2	1	7		1		1				" W. F. Sheehan.
Selma	Ala. White	3,425	8	28.32		3	4	4	1		1		1						1								" Benj. H. Riggs.
"	" Colored	7,505	12	35.28		2	5	7	1		2								1		1						
St. Paul	Minn.	53,683	89	18.80	37	7	46	43	3	2	9	7		10		3			10	3	1						" C. A. Wheaton.
Toledo	Ohio	60,000	75	15.00	28	12	38	37	3		12	1		5	1	2		2	8	3				1			" C. L. VanPelt.
Wilmington	Del. White	43,200	77	21.36	26	23			1		10	1				3	1		5		2				10		" E. B. Fraser.
"	" Colored	6,800	21	37.20					1		3								4		1				4		
Total		1,933,445	3,522	21.06	1,331	561	1,579	1,424	139	36	490	88	23	159	16	84	30	100	338	54	147	4	14	29	54	24	

GREENPORT, SUFFOLK CO., N. Y.—Postmaster David Wiggins reports, under date March 5, six cases of scarlet fever in the village.

BOSTON, MASS.—C. E. Davis, Jr., reports 28 cases of diphtheria, 20 of scarlet fever, and five of typhoid fever.

CLEVELAND, OHIO.—Health Officer G. A. Ashman, reports that the city census, taken February of this year, returns a population of 194,000.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 12 new cases of diphtheria and 18 of scarlet fever.

DETROIT, MICH.—Dr. O. W. Wight reports 17 new cases of diphtheria and 19 of scarlet fever.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports three deaths; under five years one; pneumonia caused one death and puerperal fever one.

PATERSON, N. J.—Dr. Wm. K. Newton states that during February there were reported to the city authorities four cases of diphtheria and 13 of scarlet fever.

PITTSBURGH, PA.—Dr. Snively reports the occurrence of four cases of small-pox.

FORT WORTH, TEXAS.—Mrs. Belle M. Burchill, P. M., under date of Feb. 26, reports 14 cases of small-pox and eight deaths from this disease.

MICHIGAN.—During the week ending Feb. 24, the prevailing diseases were bronchitis, rheumatism, intermittent fever, neuralgia, pneumonia, influenza and tonsilitis.

CONNECTICUT.—In his report for the month of January, Dr. C. W. Chamberlain, Secretary of the State Board of Health, says:—

This has been an unfavorable month for all lung diseases. The mortality from consumption is also comparatively large.

Hartford reports a large number of deaths from railroad accidents, mostly employés. It seems as if some additional safeguards could be provided in case of brakemen; of course nothing can prevent carelessness and inattention, from which the larger part of railroad accidents occur, but there are very many of these deaths preventable and require only a little outlay to secure, compared with the value of the lives lost.

Scarlet fever has been prevalent quite extensively in Hartford, while it has decreased very decidedly during the month in New Britain and Meriden, also in Middletown. It has apparently just reached New Haven, which reports but four deaths, although there had been occasional cases form time to time. It has extended over considerable territory and the cases have been quite numerous. It is apparently advancing, as new territory is reported each month.

Measles have been unusually prevalent in Thomaston, where there has been a sweeping epidemic. Over fifty cases were reported in January. Bronchial complications were frequent. They have not been unusually fatal, but few deaths are reported anywhere. It has been prevalent in New Haven and Ansonia and many towns in the southwestern part of the State, often, as in New Haven and Ansonia, accompanied with whooping cough. Measles are also reported from South Manchester, Plainville and Plymouth.

Diphtheria is reported from several towns, but in none as epidemic or unusually frequent.

CALIFORNIA.—The Secretary of the State Board of Health, Dr. F. W. Hatch, reports that the deaths in January numbered 172 in eighteen cities and towns, aggregating a population of 135,885, the annual rate being 15.18. The report from San Francisco is not included. Typhiod and typho-malarial fevers, so prevalent in the valley cities for the past three months, appear to be rapidly disappearing from mortality tables. A decrease is noticed also in the mortality from acute diseases of the respiratory organs.

Of the 172 deaths, 27 were caused by consumption, 19 by pneumonia, two by bronchitis, five by diphtheria, two by croup, two by scarlet fever, two by measles, three by whooping cough, three by malarial fevers, and eight by typhoid fever. No death is reported as having been occasioned by small-pox.

ONTARIO, CANADA.—The *Provincial Bulletin* for the week ending Feb. 24 reports that among fevers, enteric and typho-malarial have almost disappeared, but intermittents have continued prominent in certain districts. Diphtheria, like pneumonia, has perceptibly fallen in degree of prevalence during the week, as have likewise measles, mumps, and scarlet fever. The decline in prevalence of all zymotic diseases is considered much too general to depend upon accident, and hence would appear to be partially, at least, accounted for by the different character of the weather of the week, it having been steady, moderate, and with much sunlight, while that of the previous week was changeable, humid and cloudy.

KINGSTON, JAMAICA.—The return for the month of January shows 118 deaths; males 64, females 54; under five years, 31; 65 years and over, 12. Annual rate 38.0.

HAVANA, CUBA.—Dr. D. M. Burgess reports that there were two deaths from yellow fever, five from typhoid fever, and one from small-pox in the city during the week ending Feb. 23.

A number of cases of diphtheria have occurred during the past month. Measles prevails epidemically in the suburban towns of the Cerro and Mariano.

AUX CAYES, HAITI.—Consular-Agent Dutton reports five deaths from small-pox during the two weeks ending Jan. 27. The disease is decreasing in prevalence.

CITY OF MEXICO, MEXICO.—During the week ending January 21, there were 206 deaths; under five years, 102; over 50 years, 43. No deaths occurred from small-pox, measles or scarlet fever. Croup caused one death, typhoid fever eight, malarial fevers five, whooping cough three, consumption seven, pulmonary congestion six, and pneumonia and bronchitis 54.

ENGLAND.—Consul-General Merritt transmits the return of the registrar-general for the week ending February 17 which shows an average annual rate of mortality in the 28 large towns equal to 21.9 per 1,000 of their aggregate population. Birkenhead gave the lowest rate, 15.3, and Hull the highest, 27.5. The death rate of Bradford was unduly raised to 24.5 by the registration of 30 deaths resulting from the fall of a factory chimney in December last.

London.—2,732 births and 1,525 deaths were registered. The births were 51 and the deaths so many as 422 below the average numbers in the corresponding weeks of the last ten years. Annual mortality rate 20.1. Small-pox caused three deaths, measles 20, scarlet fever 29, diphtheria 14, whooping cough 35, typhus two, typhoid fever 23 and diarrhœa and dysentery 15. The deaths, 401, referred to acute diseases of the respiratory organs are 185 below the corrected weekly average.

IRELAND.—Consul A. B. Wood, of Belfast, sends a copy of the Registrar's return for the week ending February 17, a summary of which is given in our table.

Dublin.—Deaths 260. Rate 38.7. No deaths were caused by small-pox, measles, scarlet fever or diphtheria. Typhus caused three deaths, whooping cough 17, typhoid fever, diarrhœa and violence three each, and consumption 23.

Belfast.—Deaths 107. Rate 34.0. No deaths were registered from small-pox, diphtheria, typhoid or typhus fevers. Measles caused one death, scarlet fever ten, whooping cough six, diarrhœa five, violence one and consumption 19.

SCOTLAND.—The return of the Registrar-General for the week ending Feb. 17 shows an average rate (annual) per 1,000 of 25.8 in the eight principal towns, which is 3.0 below that of the previous week, but 2.1 above that of the corresponding week of last year. Aberdeen recorded the lowest mortality, 18.1, and Dundee the highest, 29 6. Whooping cough was the most fatal epidemic, the deaths from it being most numerous in Glasgow and Dundee.

Edinburgh.—Deaths 100. Annual rate 22.0. Measles, scarlet fever, diphtheria and diarrhœa caused two deaths each, whooping cough and typhoid fever one death each, acute lung disease 30, and violence five.

PARIS, FRANCE.—For the week ending Feb. 8 there were reported 1,146 deaths; males 609, females 537. Under five years 331; over 60 years 263; annual rate 26.59. Typhoid fever caused 41 deaths, small-pox 15, measles ten, scarlet fever none, whooping cough five, diphtheria and croup 43, dysentery one, erysipelas five, puerperal infection three, consumption 206, acute bronchitis 49, pneumonia 101 and violence 40. The report states that the increased mortality of this week is due to acute bronchitis and pneumonia; the progression of the deaths from the last-named disease has been, during the three last weeks, 79, 95 and 101. The ages of election have been those of pulmonary consumption, to wit: from 15 to 40 years—the ages of force, fecundity and production. This is not the first time that attention has been drawn to this fact.

There remained Feb. 4 under treatment in the hospital 71 cases of small-pox, 466 of typhoid fever and 41 of diphtheria.

During the week ending Feb. 14 there were reported 1,206 deaths, the highest registered during the weeks of the present year; males 661, females 545. Under five years 325, over 60 pears 284. Rate 27.98. Typhoid fever caused 39 deaths, small-pox and measles 14 each, scarlet fever two, whooping cough six, diphtheria and croup 55, erysipelas three, puerperal infection six, consumption 214, bronchitis 33 pneumonia 79 and violence 33. Of the epidemic diseases diphtheria has been most fatal, its mortality figures have increased slowly, but steadily, from 40 during the first week of the year to 55 during the present week.

The numbers remaining under treatment in the hospitals, Feb. 11, were of small-pox 66, of typhoid fever 388 and of diphtheria 45.

RHEIMS, FRANCE.—Consul Jno. L. Frisbie transmits the report for the week ending Feb. 10. Deaths 59; under five years 23, over 60, 14; males 30, females 29. Croup and diphtheria caused three deaths, puerperal infection one, acute bronchitis four, pneumonia five, consumption eight. No deaths are recorded from measles, scarlet fever, small-pox, whooping cough, typhoid fever or violence.

MARSEILLES, FRANCE.—The *Monthly Bulletin* for January reports a total of 1,097 deaths: under five years 346, over 60 years 308; males 615, females 482. There were 1,016 births during the month: males 497, females 519. Of the deaths 39 were caused by typhoid fever, 22 by measles, three by whooping cough, two by scarlet fever, 19 by small-pox, 38 by croup and diphtheria, 123 by consumption, 67 by capillary bronchitis, 64 by catarrh and pulmonary emphysema, nine by congestion of lungs, four by pleurisy, 216 by pneumonia, two by puerperal fever and 23 by violence. Population 369,099.

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GIBRALTER, SPAIN.—Consul H. J. Sprague reports that from Jan. 13 to date (Feb. 9) 17 cases of small-pox have occurred, resulting so far in four deaths; the remaining cases are reported as progressing favorably.

BRUSSELS, BELGIUM.—During the week ending Feb. 10 there were 191 deaths in the city and its *faubourgs*, equal to an annual rate of 24.2. The births during the same period numbered 268, equivalent to an annual rate of 33.8. Of the deaths 79 occurred in children under five years of age.

Small-pox caused five deaths, measles two, scarlet fever one, typhoid fever three, diphtheria none, croup three, whooping cough three, diarrhœal diseases 16, bronchitis and pneumonia 37 and consumption 23.

ST. PETERSBURG, RUSSIA.—Consul-General Edgar Stanton reports 722 deaths for the week ending Feb. 3; males 406, females 316: under five years 315, over 60 years 73. Population 929.525. Small-pox caused 14 of the deaths and fevers 35.

COPENHAGEN, DENMARK.—There were 119 deaths during the week ending Feb. 6; under five years 56, over 60 years 34. Annual rate 24.76. No deaths are reported from small-pox, measles, scarlet fever, typhoid or puerperal fevers. Diphtheria caused one death, croup three, whooping cough two, diarrhœa five, erysipelas two, consumption ten, pneumonia ten, bronchitis ten, pleurisy one, and violence two.

The following cases were reported during the same period: measles one, scarlet fever 25, diphtheria 13, croup four, whooping cough 54, typhoid fever three; diarrhœa 77, erysipelas 26, bronchitis 928, pneumonia, 70, and tonsilitis, 134.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 97 deaths for the week ending Feb. 3; males 57, females 40; under five years 43, over 60 years 14. Annual rate 29.0. No deaths are reported from small-pox, whooping cough or accidents. Measles caused six deaths, scarlet fever three, puerperal fever one, diphtheria and croup five, typhoid fever one, diarrhœa four, consumption 14, pneumonia 16, and bronchitis seven.

During the week ending Feb. 10 the following cases were reported. Measles 65, scarlet fever 30, erysipelas seven, whooping cough three, diphtheria and croup 12, typhoid fever seven, diarrhœa 19, tonsilitis 20, pneumonia 16, pleurisy three, and acute bronchitis 96.

ROTTERDAM, NETHERLANDS.—Consul Jno. F. Winter reports 104 deaths during the week ending Feb. 17 in a popolation of 157,270. Of the deaths six were referred to small-pox. Twenty-one new cases of this disease occurred during the week.

VIENNA, AUSTRIA.—Consul-General Weaver reports for the week ending Feb. 10, 475 deaths, giving an annual rate of 32.9. Small-pox, measles and typhoid fever caused one death each, scarlet fever two, diphtheria five, whooping cough eight, consumption 126, acute lung diseases 92. The deaths of persons under five years numbered 177.

MADRAS, INDIA.—Consular-Agent L. Strange transmits report for the week ending Jan. 19, showing 361 deaths equal to an annual rate of 39.4; males 140, females 161. Small-pox caused eight deaths, measles three, fevers 64, dysentery 31, diarrhœa 13 and cholera none.

The return for the week ending Jan. 26 shows 305 deaths; males 168, females 137; rate 39.9. Small-pox caused seven deaths, measles three, fevers 76, dysentery 29, diarrhœa 13 and cholera none.

CALCUTTA, INDIA.—Consul-General Mattson reports 350 deaths for the week ending Jan. 20 giving a ratio per 1000 per annum of 42.1 as compared with 36.3 in the previous week. The cholera continues to abate, 47 deaths only having been reported from this cause. The number of deaths from fever amounted to 76, from bowel complaints 64, from tetanus 27, from consumption 10, and from pneumonia five.

BOMABY, INDIA.—Consul B. F. Farnham reports that during the week ending Jan. 30 there were 496 deates registered or 29.34 per thoofand. There were 73 deaths from remittent fever, being 26 less than in the previous week and 22 less than in the same period last year. The deaths from diseases of the respiratory organs, diarrhœa and dysentery were last week 68, 29 and seven respectively as compared with 99, 23, and 14 in the same time last year.

SHANGHAI, CHINA.—Vice-Consul-General F. D. Cheshire reports Jan. 23 that the cases of small-pox among the natives are decreasing in number. A mild type of measles is prevailing among the foreign children.

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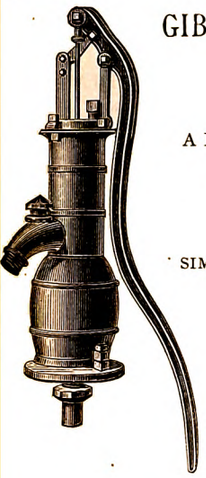

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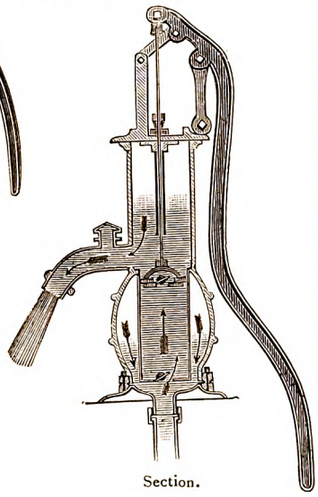

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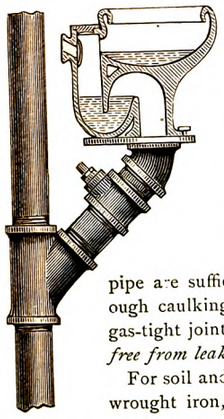

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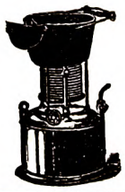

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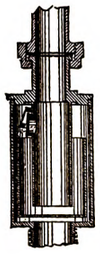

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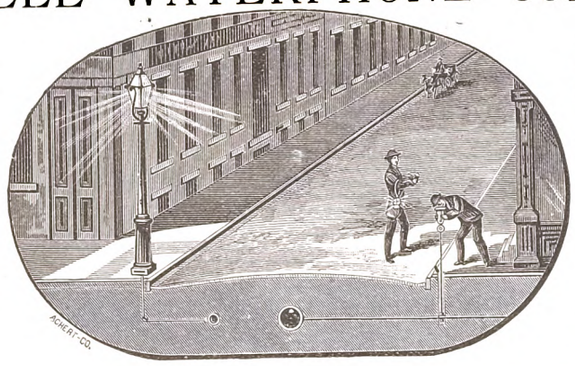

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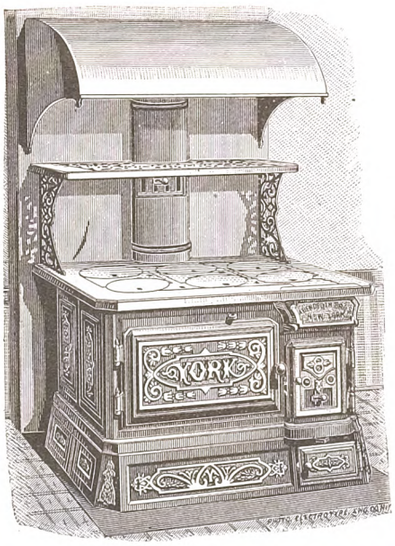

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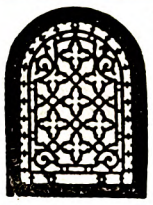

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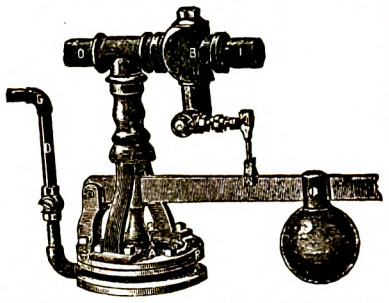

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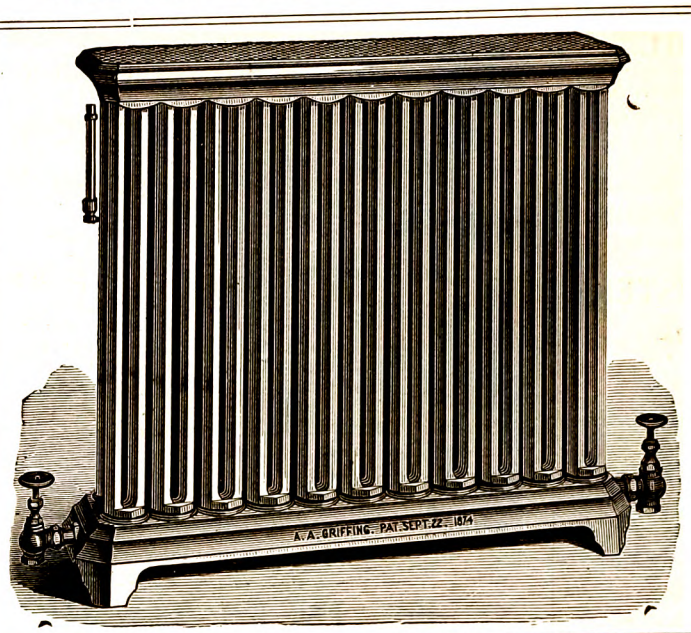

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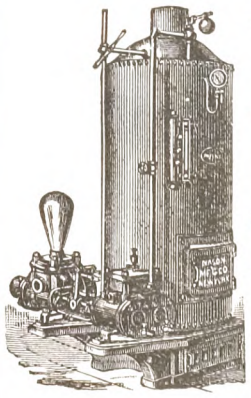

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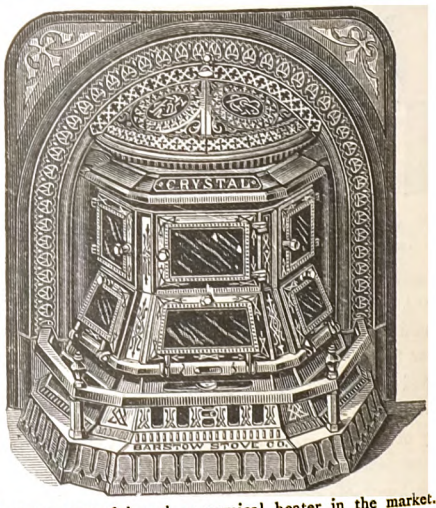

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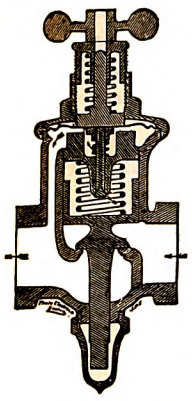

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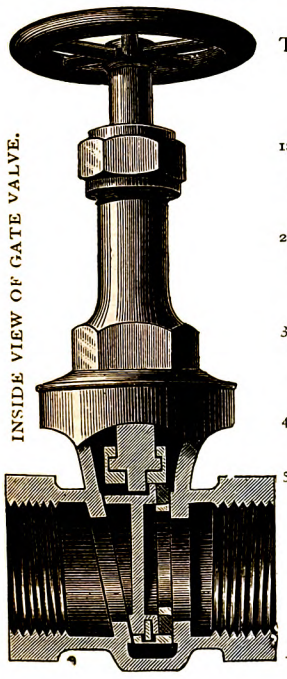

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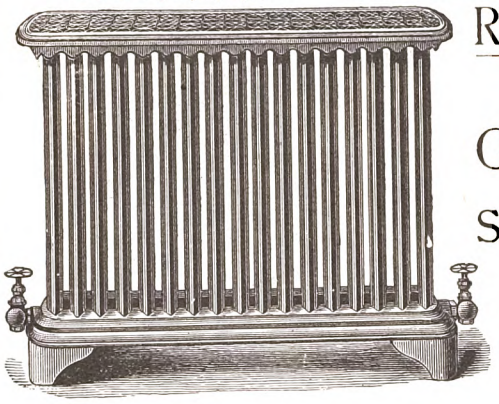

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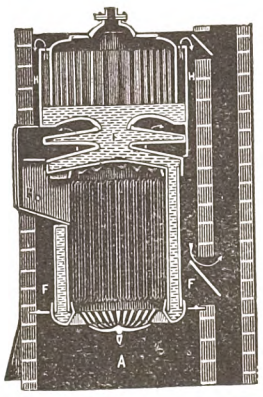

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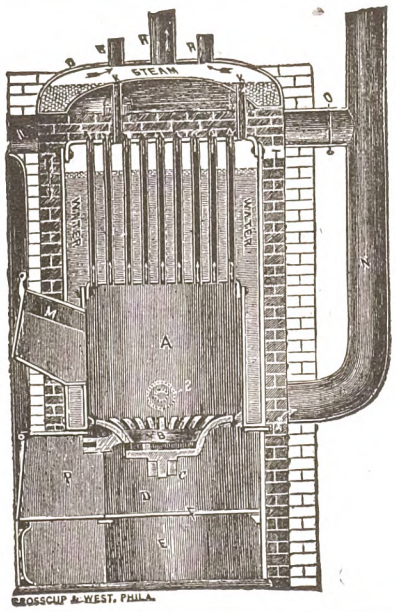

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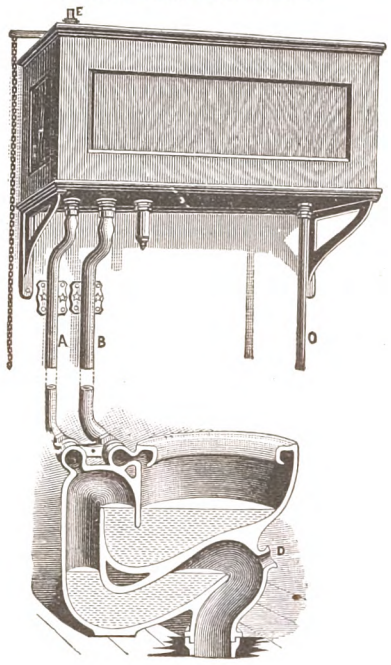

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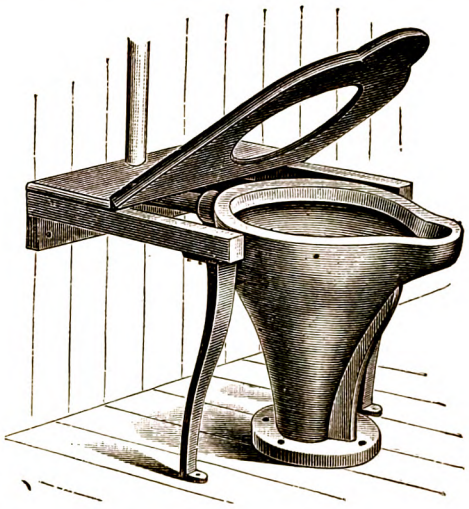

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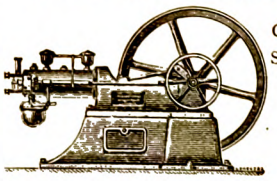

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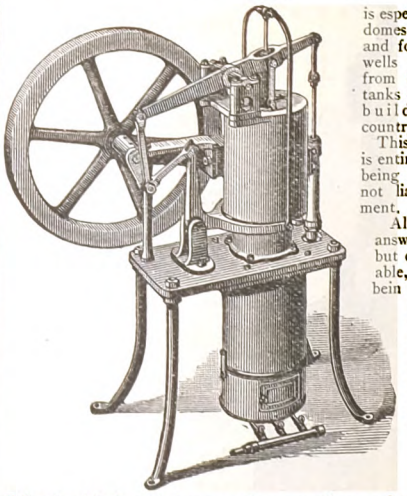

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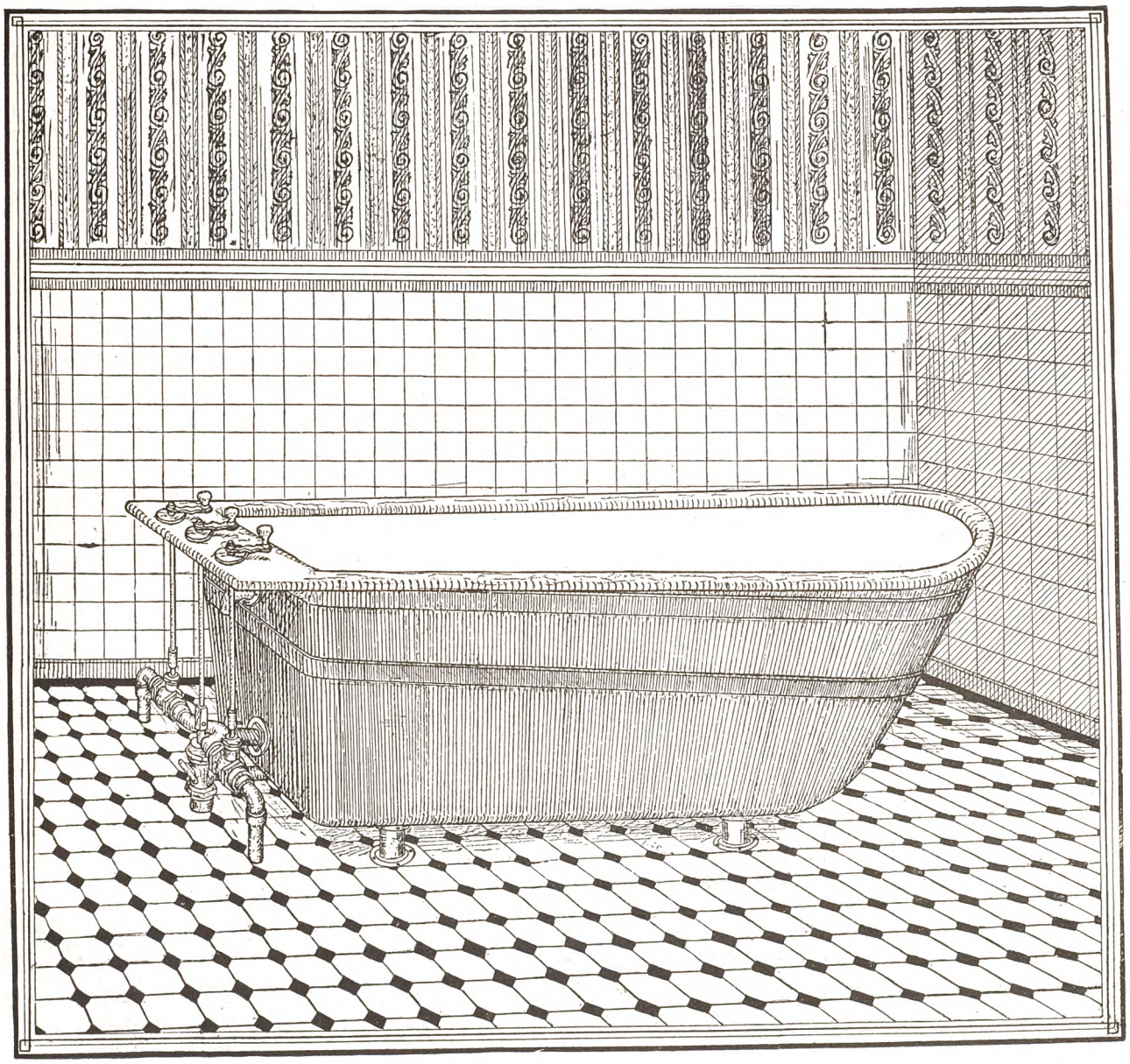
These Baths have also been placed in rooms in a hospital in the same manner with the exception that the tubs were set on a floor of flagging and the supply and emptying cocks were placed below the floor, the rods simply running through. The wooden capping, however, was omitted.



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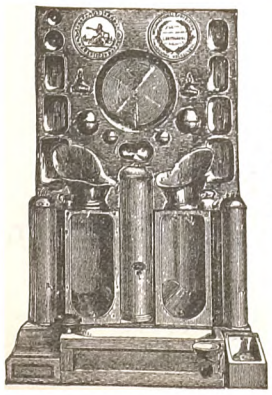

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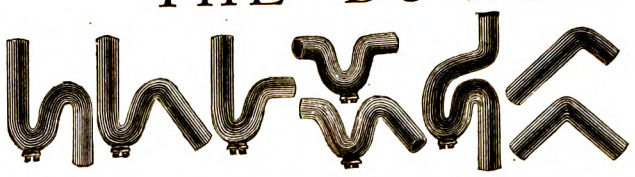

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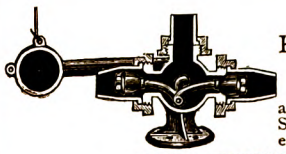

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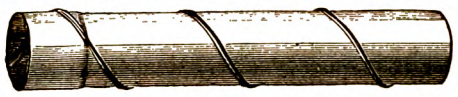

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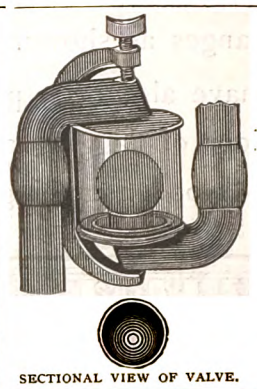

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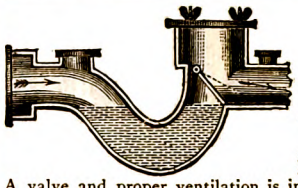

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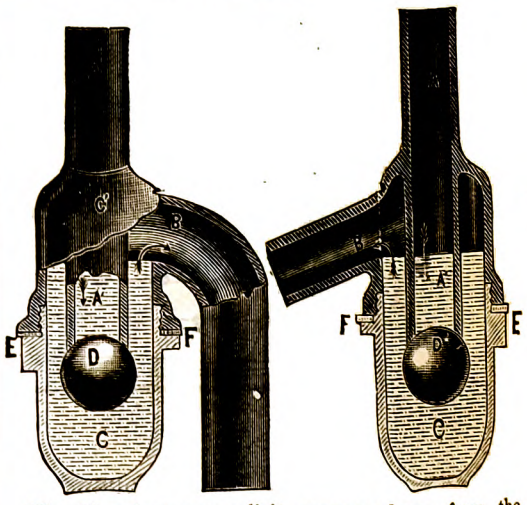

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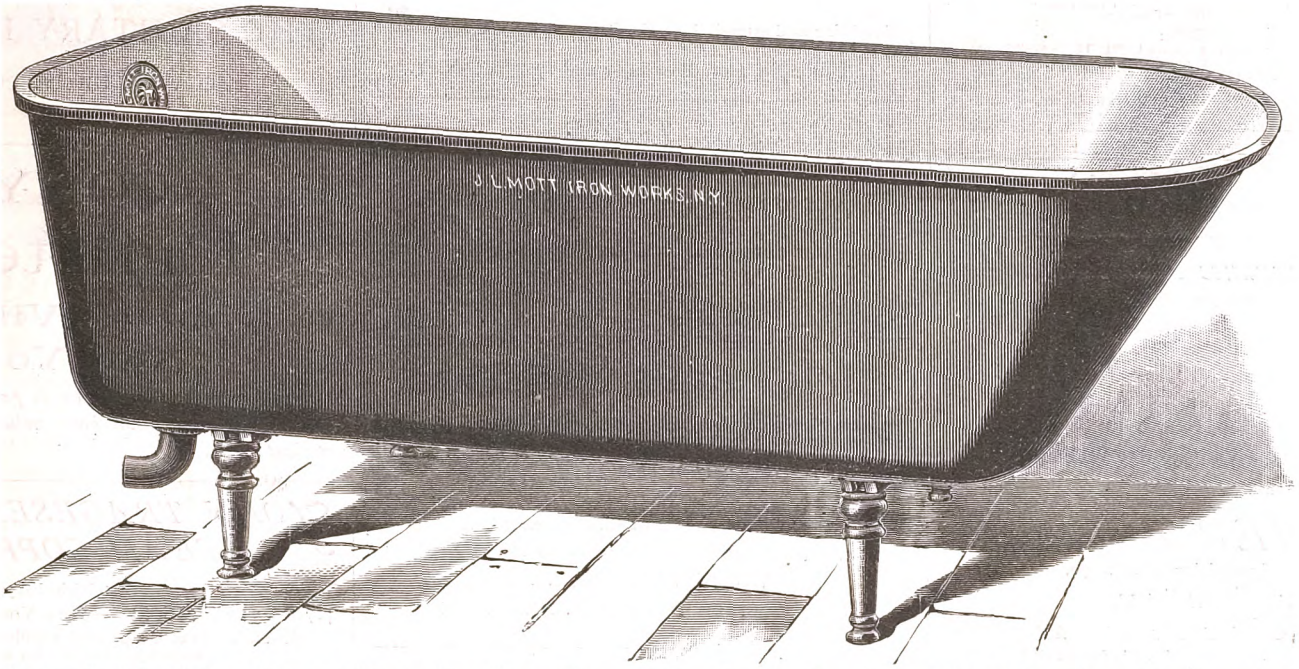
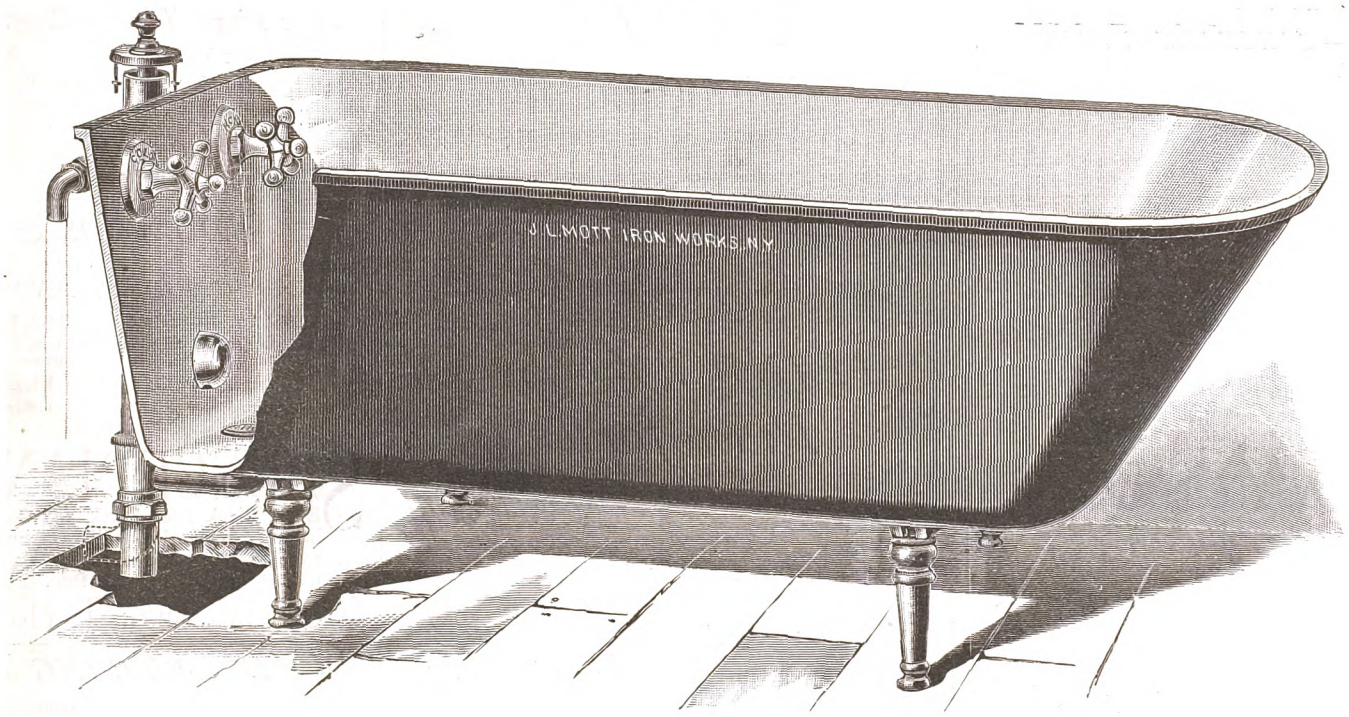


Shows Bath with Overflow and Waste Coupling—Plug and Overflow Strainer being Nickel Plated and Plug furnished with Rubber Stopper.



Shows Bath with Nickel Plated Cocks, Bottom Supply and "McFarland" Waste Fixtures complete. Fixtures furnished Silver Plated to order.

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PUBLIC HEALTH LEGISLATION.

The present condition of affairs as regards public health legislation in the United States must be a matter of great regret to all who take an intelligent interest in this subject. As regards the National Board of Health, Congress has refused to appropriate any money for its work, and has contemptuously allowed $10,000 for the pay and *personal* expenses of its members, as much as to say, "that is all you are really contending for."

In Pennsylvania, the bill to create a State Board of Health has failed. In North Carolina, the Legislature has refused to appropriate any money for the expenses of its Board of Health.

The unsatisfactory condition of the health section of the Massachusetts Conglomerate Board is well-known to all our readers. It seems evident that our legislators, State and National, do not believe that their constituents take any real active interest in this matter; it is never alluded to in party platforms or the addresses of candidates for office, and they look on it as merely an effort of a few men to create offices for themselves. The fact that the majority of physicians are in favor of health officers and sanitary legislation they explain by saying that the men who want the offices are doctors who have not succeeded in practice, aud that the rest of the doctors will help them out of a feeling of clannishness, etc.

This idea that public health interests are really the interests of a few doctors and sentimental enthusiasts, is one of which the mind of the average congressman will never be disabused until he finds that his actions in accordance with this idea are an obstacle in the way of his re-election, or until the occurrence of a great epidemic creates, under the influence of panic, a public opinion before which he must bow temporarily even while secretly sneering at it.

As regards the National Board of Health it is now necessary for those who have been interested in it and in its work to consider what should be done next. It is to be presumed that most of the present members will at once resign and give the President an opportunity of trying to fill their places with men whose views will be treated with more respect by Congress.

On the whole we are not sure but that it would have been better for the cause of a permanent national health service if the friends of the present Board had permitted the late Congress to kill it outright rather than to have the present starving out policy instituted. It seems that it will require another devastating epidemic with the attendant paralysis of trade, loss of lives and money to awaken a proper public interest in the cause of national hygiene.

REPORT OF THE COMMISSION ON INCREASING THE WATER SUPPLY.

The Commission appointed by the Mayor to examine, in connection with himself, into the best methods of improving the water supply of New York City, made its report to the Legislature on the 9th inst., and endorsed unanimously the plan proposed by the engineers of the Croton aqueduct for a new conduit, built chiefly in tunnel from Croton river to the city.

As to the dimensions of the aqueduct, the commissioners recommend an increase in its size, which, if carried out, will probably increase its cost by about three million dollars, and its capacity by about one hundred and fifty million gallons daily.

As regards the location and size of storage reservoirs, a difference of opinion existed among the Commissioners. This was natural with their limited knowledge and cursory examination. They acted wisely in abstaining from troubling the Legislature with their divergent views on matters concerning which they really knew nothing, and left those questions of detail to those who will be called on to carry out the work.

An excellent recommendation is that which relates to the retention of the Forty-second street reservoir, and its utilization in the proper manner.

It is gratifying to note that the Commission appreciate the necessity of at once instituting measures to suppress the enormous waste of water now prevailing. They advise that power to do this be given to the Department, and that "it be directed to use such power effectively to this end." This is excellent advice, and it is to be hoped that the Legislature will heed it.

Before adequate funds and powers are granted, however, it may require another commission to take testimony and make specific recommendations, since it appears that public confidence in, and support of, any efficient measures, are likely to be lacking, until gentlemen who know nothing of these matters are appointed to take testimony and make recommendations. To professional men this method of procedure seems inexplicable, yet our experience in the matter of the increased water supply indicates that in this community at least, technical matters require the endorsement of laymen.

It is earnestly to be desired that with this report before them, the Legislature will promptly authorize the inception of the great work, and will thus remove the great obstacle which has for

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several years prevented a succession of incumbents of the Department of Public Works from making any real efforts to stop excessive waste of water. This matter being disposed of, it may be possible for its head to devote his attention to this problem.

NEW YORK'S WATER SUPPLY.

No. IX.

THE SUPPRESSION OF WASTE.

(Continued from page 338.)

Having in preceding articles pointed out what has been accomplished in the way of preventing waste of water by the adoption and enforcement of efficient measures in Great Britain, we will now briefly review the situation in this country. In looking over the field we are bound to admit that, with the exception of two cities, hardly a beginning has been made, though considerable has been said on the subject in print, and a scarcity of supply has forced the consideration of the matter on engineers.

Providence shows the best record of any city in this country so far as the amount of water consumed goes; though it is true the introduction of public water is of comparatively recent date (1870) and from the commencement meters have been in general use. The amount delivered is 32 gallons per head daily, while Milwaukee,* a city of about ten thousand more population, with no special regulations to restrict waste, disposes of 100 gallons per head daily. Such a showing indicates what it is possible to secure by good management.

The following data, for which we are indebted to Mr. Samuel A. Gray, City Engineer, was prepared in response to certain enquiries made by us, and will be found of special interest. It certainly makes a good showing for the meter system.

engines were stopped five days. Had nothing been done to check waste, it will be seen that even this very slender reserve could not have been had, for taking the ordinary increase on the basis of former years' consumption, the original one hundred millions would have been exhausted before the engines were started. After this experience, we imagine the people of Cincinnati will more thoroughly appreciate the value of vigorous waste prevention measures.

In this connection the following data and description of the methods employed may be of interest.

They began the waste inspection with the aid of waterphones the last of November, 1881, although it was not systematically done until July, 1882. The population at that time was estimated at 264,000; it is now estimated at 280,000.

The daily consumption for November, 1881, was 19,706,903 gallons, that being the average for the month. The daily average for January, 1883, was 16,264,000 gallons.

There are employed six men specially on waste inspection and three others at irregular intervals. The annual cost is $5,500.

The method of operation is as follows:

The inspector, with assistant, is furnished a record book, containing the number of house, service stop and location of same, and blank columns for record of inspection, a hydrant key, lantern and waterphone. He begins work at 11 o'clock each night and stops at 4.30 A. M. He reports at office at 8 o'clock the results of night inspection, and then views, or rather inspects, the various premises where running water was detected the previous night. His record of the night work shows him the character of the flow, viz.:

First. Whether it is a large flow or abuse, or a small one or leak.

Second. Whether it is in street or outside of stop, or inside of premises.

If a fitting is found a second time out of order, or, in the judgment of the inspector, it cannot be repaired, it is condemned.

The following was the consumption of water for 1882:

	1881. Gallons.	1882. Gallons.
Total pumpage	8,623,788,320	[illegible]
Deduct injection water for low pressure engines	190,994,220	[illegible]
Deduct differences in coils of reservoir	35,140,000	[illegible]
Total actual consumption of water	8,397,654,200	[illegible]

DAILY AVERAGES.

	1881. Gallons.	1882. Gallons.
January	18,406,655	17,287,470
February	19,515,450	17,551,835
March	18,892,087	17,493,952
April	19,283,414	19,801,362
May	23,534,065	19,804,432
June	23,484,225	20,685,542
July	28,507,603	21,255,538
August	31,665,708	22,246,513
September	28,871,689	22,004,314
October	25,802,557	21,374,545
November	19,706,973	18,005,442
December	18,056,895	16,800,083
	23,007,272	19,524,848

CONSUMPTION PER CAPITA.

	1879.	1880.	1881.	1882.
For general surveyed rents	26.5	27.	27.7	28.
For metered rents	5.	6.7	6.	8.5
For hydraulic elevator rents	3.	4.9	4.	5.
For street sprinkling rents	.7	.8	.6	.7
For free water, fire purposes, etc.	2.	2.7	3.1	3.2
For waste	30.8	32.9	45.6	24.3
Total	68.	75.	87.	69.7

Classification of abuses and leaks discovered and corrected for the year 1882.

Wilful cases, abuses in water closets	170	
Wilful cases, abuses in hydrants	211	
Wilful cases, abuses in urinals	19	
		400
Leaks in water closets	389	
Leaks in faucets	771	
Leaks in hydrants	1,107	
Leaks in hose plugs	119	
Leaks in lead pipes	286	
		2,672
Underground leaks in lead pipes	299	
Underground leaks in stops	86	
Underground leaks in hydrant stocks	1,035	
		1,420
Miscellaneous leaks		314
Total abuses and leaks		4,806

(To be Continued.)

CITY ENGINEER'S OFFICE, WATER DEPARTMENT, PROVIDENCE R. I., MARCH 7TH, 1883.

Data relating to Meters, Daily Consumption of Water, etc., for the past six years. *Providence Water Works.*

Year.	Estimated Population to Middle of the Year.	Number of Meters in use Dec. 31st.	Net Amount charged to Meter Drpt. for Setting and Repairing Meters, Etc. *	Number of Services Opened to Dec. 31st. †	Total Water Receipts for the Year.	Average Daily Consumption of Water during the Year.	Gallons per Capita.	Per Cent of Meters to Services Opened.	Estimated per cent. of Length of Received and Platted Streets and the Received Streets, to the Length of Distribution Pipe Laid. Received and Platted.	Received	Remarks.
1877	101,000	3,203	$476.40	7,789	200,039.39	2,492,032	24.7	41.1	49	93	
1878	102,286	3,648	602.34	8,566	218,883.33	2,701,404	26.4	42 6	50	95	Water rates reduced.
1879	103,572	4,036	805.37	9,139	229,551,78	3,110,279	30.	44.2	49	96	
1880	104,857	4,452	324.35	9,757	247,705.06	3,547,264	33.8	45.6	49	97	
1881	109,671	4,784	111.99	10,305	260,530,87	3,716,937	33.9	46.4	51	98	
1882	114,377	5,279	57.39	10,919	269,318.77	3,065,427	32.	48.3	51	100	Water rates reduced
			$2,377.84								

* Yearly balance from the books of the water board: for individual years it is only approximate, as the amounts are not entered until the bills are paid, which is more or less in the following year. The total sum of the six years is very nearly correct, but from this amount also should be deducted some charges which were paid early in 1883. The employés of the meter department are at times called upon to do other work than that actually pertaining to meters, but they do not read the meters.

† The actual number of services in use December 31st, 1882, was 10,357, and the difference between 10,357 and 10,919 should be the number closed, disconnected, etc., since the first service was opened in 1871; therefore, the actual per cent. of services now open, metered to December 31st, 1883, is 51, instead of 48.3 per cent. as above.

All of the above figures include data for 76 miles of pipe supplied with water lying outside of the city limits, with the exception of population and per centage of streets in which pipe is laid, which include only the city proper.

We believe that the scale of water rates is so arranged that most consumers elect to have meters. They find that with care their tax is less than if they pay for each fitting in a building in accordance with the published schedule.

Cincinnati is another place that has accomplished something in reducing the amount of waste, and that seems to be mainly due to the efforts of the authorities, aided by the use of the Bell Waterphone, to discover where abuses existed and waste was occurring.

During the recent flood in that city, it will be remembered, the pumping engines were stopped by the high water, and a very possible calamity averted as the direct results of their waste prevention efforts. It seems that when the pumps stopped there were about one hundred million gallons in the reservoir, and when pumping was resumed there were forty millions left, and the

* From advance sheets of Statistical Tables of American Water Works, by J. J. R. Croes, M. Am. Soc. C. E., M. Inst. C. E.

He first examines for abuses, then visible leaks, after which he tests for underground leaks, and then makes a record, accordingly, opposite the premises. If there is an abuse he leaves a notice to that effect; if a leak he gives a leak notice.

We are indebted to the officials for the following data, which shows the comparative consumption of water (daily average) since 1879:

	January. Gallons.	*February.* Gallons.
1879	15,430,638	15,198,733
1880	15,569,532	15,452,402
1881	18,406,655	19,515,450
1882	17,287,479	17,751,835
1883	16,264,000	15,320,687

The authorities do not presume to regulate, inspect or interfere with the plumbing inside of houses, further than to require defective fittings repaired or replaced. Plumbers are licensed and required to use the regulation service pipes, sidewalk stop and box; otherwise no discrimination is made, except as to hopper closets, which are charged double the usual rates.

The bill introduced into the California Legislature some time since to regulate plumbing in the cities and towns of that State was signed by the governor the 15th inst. The provisions of this law, published in our issue of December 14, 1882, require the registration of all master or journeymen plumbers at the health offices of the several cities and the filing of plans of proposed work. Indeed the California law is very similar to the New York law. By its passage our most Western State gives another evidence of the traditional wide-awakeness of that section of the country.

We print elsewhere two letters by Col. Mendell, U. S. A., transmitted to us by the courtesy of Dr. Sternberg, one referring to the sufferings of cattle from malarious diseases in certain localities, the other to the coincidence of malarious affections with shallow wells. We are always glad to receive communications of this kind, and should be pleased to hear from others of our army readers. Well observed instances of malaria in animals are especially desirable.

We print elsewhere in this issue the full text of Judge Freedman's opinion recently given in the case of the Health Department of this city against one O'Reilly. The suit, which was begun last December, was to obtain a continuation of a temporary injunction restraining the owner from using, leasing or renting a tenement house which had been constructed in violation of the law providing for the proper lighting and ventilation of such buildings. Some of the points of the defense were, that the Board had no right to an injunction, especially since the building was erected before the injunction was sought, and that having granted a permit for the erection of the building they must revoke that permit before commencing suit. The decision is important as being the first written opinion on the right of the Board of Health to injunctive relief in the case

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of violations of the light and ventilation law. The right to injunction in cases of the violation of the plumbing law is clearly given in the law itself. An appeal from Judge Freedman's opinion has been made and a stay of proceedings granted.

THE ROCKWELL CASE AGAIN.

BUFFALO, N. Y., *Mar.* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

I enclose you a couple of newspaper clippings, also an article copied from the New York *Times*, "Watch the Traps," in which it appears a number of persons died from the effects of sewer emanations in a house claimed to have been fitted in accordance with the *most perfect method of sanitary engineering*.

If such was the case it seems to me that it would have been (or at least should have been) impossible for the sewer air to enter the rooms.

As such published statements have a very damaging effect upon the progress of sanitary plumbing, it would be well if this case were looked into, and a true and correct statement of the manner and condition of the plumbing were handed to the paper that published the account, or else made public through THE SANITARY ENGINEER. It is more than possible that the work (which was done in 1878) was not performed in accordance with the present methods, or, if so done, was slighted in some important detail which rendered the whole work imperfect.

My attention was called last week to the plumbing now being done in one of the largest and most costly dwellings in this city. The owner, I presume, *supposes* he is getting the best kind of sanitary plumbing. The vent pipe from the trap of closet was reduced from 2 inches to 1 inch, and several feet of the 1-inch pipe was run before it entered soil pipe, and the connection with soil pipe was by a putty joint made in a reversed Y-branch. I have no doubt that in the case of the Brooklyn house might be found errors fully as bad as the above.

A well-established refutation of the claim that the plumbing in Mr. Rockwell's house was the most perfect that modern sanitary engineering could devise would do much good and afford great satisfaction to many persons who now consider the money wasted that they have expended on costly sanitary plumbing.

Yours respectfully, EDWARD L. COOK.
16 W. EAGLE ST.

The following are the important parts of the *Times* article:

"In the erection of the building Mr. Rockwell spared no expense to render it perfect in every detail of modern sanitary engineering; but, as appears from subsequent occurrences, altogether in vain. The family had scarcely moved into their new residence, when, in December, 1878, Mr. Rockwell's little granddaughter died of scarlet fever and his grandson barely escaped with life. A couple of months later the old gentleman himself died of diphtheria in its most malignant form. An investigation showed that the traps in the wash-basin and bath-room connected with his sleeping apartments has been disarranged by the pressure of the gas, and that the atmosphere he breathed at at night was loaded with infectious matter. It was discovered also that the house was so situated as to form a sort of ventilatilating shaft for the Furman street sewerage system, standing upon high ground, so that the pipe constituted the apex of the whole network of conduits with which they communicated. The result was that, with the best work in the world, it would have been next to impossible to prevent percolation into the building of the noxious gases of decay. Mrs. Rockwell, the widow, was buried on Saturday, February 24, a sudden attack of pneumonia, the way for which was prepared by the malarious atmosphere, having terminated her life. As the the facts connected with the death of the granddaughter, the illness of the grandson, and the subsequent demise of Mr. Rockwell, are such as to point to infection from the sewage pipes as the cause of the trouble, and as, in some particulars, the case is as typical of sewer-gas poisoning as that described by Dr. Keating, of Philadelphia, recently adverted to in these columns, it is not surprising that medical men have already evinced an interest in its details. It seems clear that there was a relation of cause and effect between the disarrangement of the traps and consequent infection of the house with sewer gas, and the attacks of scarlet fever and diphtheria that so immediately followed. In point of fact, Mr. Rockwell had erected a handsome ventilator for the Furman street sewer, while intending to produce the most perfect piece of sanitary construction in Brooklyn; and through this mistake the beautiful home he had founded was broken up, and three lives were sacrificed to the fetich of that mysterious germ which none but M. Pasteur and Mr. Tyndall have ever yet discovered. The facts of the case should be carefully investigated, and if, as a prominent engineer remarked the other day, tales could be told of the plumbing of our houses of which none yet dream, a new crusade of sanitary science should be set on foot at once. An eminent physician has defined a basin in one's room as a small sewer ventilator located under one's nose, and experience seems to show the justice of the definition.

The report upon the Rockwell Case will be found in this journal for February, 1879, p. 61. a portion of which we quote:

We give herewith the main points of the Brooklyn Board of Health inspector's report on the drainage system of the late Mr. Rockwell's house on Brooklyn Heights, about which such a sensation has been made, presumably because the owner being wealthy, it was supposed his plumbing must be perfect. That his death was the direct effect of the faulty construction of his drain pipes is, after all, merely an assumption. The facts were that Mr. Rockwell's grandchild caught scarlet fever; he nursed her and was taken with it the day after her burial. The seeds of this disease may have come through their unsealed traps, or it may have been caught by exposure to it, no one knows where. That the drainage system, as reported by the inspector, was faulty, no one can deny who has given the matter any attention; but to blame the party responsible for its arrangement would single out one man who, in the light of knowledge then prevailing, did as well as ninety-nine out of every hundred would have done at the time. The house was situated on a superb site overlooking New York Bay, and was believed to be a model in every respect. The plumbing materials were of the best and the workmanship was exceptional. The Board of Health inspector, however, states, that while the main lines of soil pipe were continued to the roof, some of them were also used as rain-water leaders.

"One of these received the rainwater from 1,200 square feet of roof, and during heavy rains was so filled with water as to empty every trap connected with it. It was to this pipe that the water closet in Mr. Rockwell's bath room was connected.

"The water pipe connected with the wash basins in Mr. Rockwell's sleeping room on the second floor and the nursery and sleeping rooms on the third floor were not carried to the roof, nor were the traps ventilated. The traps on this line of waste pipe were not only syphoned by their own use, but the use of a basin on the third floor would empty one below and *vice versa*. The waste pipe connected with the butler's sinks on the kitchen and parlor floors was not carried to the roof, and these traps were also syphoned. There was no trap cutting off the house from the public sewers. Lastly, a tank on the top floor had its overflow pipe connected with the soil pipe, and analyses of its contents showed organic impurities."

Mr. Rockwell's drain pipes dropped almost perpendicularly down a steep hill with a fall of 50 feet, and there entered into an old sewer believed to be defective. Hence special facilities were offered for foul gases to enter the house. This work was executed five years ago, and so far as the plumbing was concerned, it was honestly and faithfully done; but the plumber had no discretion in the arrangement, and the responsibility rests with Mr. Rockwell and his architect who made the plans and had their ideas carried out, the plumber being in no way consulted.

It should be borne in mind that this work was done in 1875, since which time much has been learned.

So far as the scarlet fever is concerned, it is in the highest degree improbable that the plumbing arrangements had anything to do with it.

However this may be, the fact that bad results follow from improper plumbing does not prove that there is any danger connected with good and properly arranged plumbing.

What the writer in the *Times* means by the statement that "three lives were sacrificed to the fetich of that mysterious germ which none but M. Pasteur and Mr. Tyndall have ever yet discovered," we do not know. If it is intended to throw doubts on the existence of a germ as the cause of diphtheria and scarlet fever, it does not follow from the facts cited. Meantime it seems to us that the writer should consider what the results of his attacks on sanitary pumbing will be if successful, and endeavor to discriminate between good work properly planned, bad work on good plans, and good work on bad plans.

HOW TO MAKE A PLACE UNHEALTHY.

In the first place no means should be used to prevent the spread of contagious, infectious and pestilential disease. If you have small-pox in the house carefully conceal it. If it were known to exist there, especially if you keep a grocery, a meat market or a saloon, and live in the same building, it might hurt your business. If your family doctor calls it small-pox, look daggers at him, and suggest that his services are no longer needed. Threaten him with all the calamities of your unbridled displeasure, if he dares to report, especially to the diabolical board of health, that there is a case of small-pox in your household. If the health officer comes around to interfere threaten him with a mob. If any movement is made to prevent the spread of the disease by vaccination, the town board or common council has a fine opportunity of showing its appreciation of public economy by refusing to make an appropration of tax-payer's money for any such purpose, and if the Anti-vaccination Society sends you a tract, read it carefully and swallow its nonsense as gospel. In due time the loathsome disease will break out all around you in the neighborhood, and will be multiplied in your own family. Then denounce the public authorities for neglecting to protect the people.

In the second place, conditions of filth abound everywhere, which may be utilized for the purpose of making a place unhealthy. All households furnish organic refuse in great abundance, which it requires no effort, nor even intelligence, to so dispose of as to produce the maximum amount of health-destroying poisons. Fortunately, in resisting the encroachments of sanitarians, it is a good deal easier, much more in accordance with the inclinations of human laziness, to leave decaying vegetables in the cellar all summer, than to remove them to a distant compost heap. The cellar windows should be closed to keep out the wind, rain and cold. This valuable source of making your habitation unhealthy may be increased by neglecting to drain the site. If the cellar occasionally half fills with water, in a season of rain, and rotting potatoes, turnips and cabbages float around in it, especially if you have to wade in it to get at the butter tub, milk pans and pork barrel, the means of unhealthiness will be greatly improved, although not yet perfected. If you live in town you can have a big untrapped wooden box, or porous cement pipe, running from six or eight inches above the bottom of the cellar to an unclean brick sewer in the street, through which great volumes of putrefactive gas, laden with invisible vermin called bacteria, perhaps with the germs of contagious disease from neighboring premises, can freely enter there to mingle with the malaria already formed, and flow up through all the living rooms of your habitation. In the winter bank up your house, and allow no portion of the foul air to escape into the outer air, or any pure air from without to get in. Manure is a good material for such a purpose. The fires started when the cold weather comes will make the house itself act as a funnel to draw upwards the poisonous exhalations from the bottom. Only one thing more is wanting to make the arrangement complete; if you live in town, you can have an unventilated water closet, in some dark interior part of the house, with imperfectly jointed or cracked soil pipe, the sulphuretted and carburetted hydrogen gas from which will give the finishing flavor to the atmosphere of your dwelling.

Having thus secured air best adapted to make your home unhealthy, you should also provide an abundance of commendably unwholesome water. The task is not a difficult one; it requires no scientific knowledge and not an unusual amount of intellect. If you live in a city, be sure and help elect officers who will take the public water supply from a source near by, and probably polluted with sewage, in order to save a little expense. If you live in the country, you can make a group of the barn yard, hog pen, dog kennel and back-house, with the well in the centre. Never remove the manure from the outhouses. Dig a great hole in the ground for a privy vault, and in it treasure up the vilest excreta for years. If the vault at length becomes full, throw a little dirt over it and dig another hole. Through the porous earth the putrescent mass will slowly drain to the well, in which hangs "the old oaken bucket." In Northern Scotland, as late as the sixteenth century, the people would dig up a corpse, cut off the head, soak it in a bucket of water, and then drink the water as a cure for witchcraft. They called it "dead bree." You have provided a still more potent "dead bree" in the water of your well. Several tons of foul, putrid excrement near by it, may safely be regarded as more poisonous than a whole graveyard full of corpses. The adjacent heaps of the excreta of cattle, swine and dogs are not of equal unsanitary value, but they are effective adjuvants. Use the water long enough and it will cure you and your household, not only of witchcraft, but of all other mundane ills. If the sanitary busy-body says anything about your fine well, show him the clear, cold, sparkling water, and laugh at his moonshine about chemistry and the microscope. Remind him scornfully that the evidence of your unaided senses is better than all his newfangled science.

If would probably be superfluous to give any directions how to add unwholesome food to impure water and foul air.

If, under such combined influences, you and your family become sick with malarial, typho-malarial or typhoid fever, diphtheria, dysentery, or other filth disease, and your doctor should look around your premises for the cause, admonish him that he has been sent for to give medicine and to cure, and not to meddle with private affairs and question Providence. The kitchen slops thrown on the ground, under your sick room window, there putrefying in the summer sun, may subject you to the temporary inconvenience of closing the window, to shut out the rank odor and the green flies, already ominous of the inch-long banqueters that, sooner or later, feast on the remains of all. A stink is nature's emphatic and rather frank opinion of filth, but never mind her voice, for she may be in collusion with the unregenerate sanitarian.—DR. O. W. WIGHT, *to the Sanitary Convention at Pontiac, Mich.*

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WARMING AND VENTILATING THE OPERA HOUSE AT OGDENSBURG.

We illustrate this week the warming and ventilating of the new Town Hall at Ogdensburgh, in the town of Oswegatchie, N. Y.

The building though known by the name of "Town Hall," is in reality the municipal building, jail, town hall and opera house combined.

The auditorium of the theatre is 60 feet wide by 68 feet long and 50 feet high with two galleries, and will seat 976 persons.

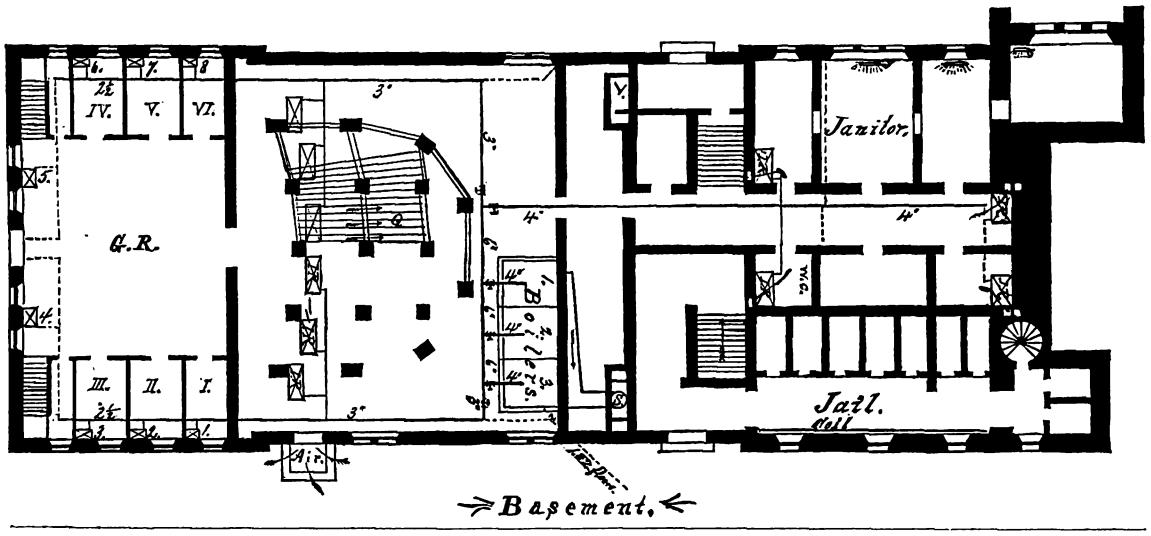
The stage at the curtain is 35 feet wide and 40 feet deep with a height of 60 feet.

The system of warming is by direct and indirect radiation combined, and the ventilation is produced by a *vacuum movement;* aspirating shafts exhausting the air at the levels of the floors and ceilings of the main floor and galleries.

In cold weather the aspirating shafts are assisted by the natural condition produced by the dense cold air forcing its way to the inlet ducts.

The warmed air in winter and the fresh air in summer is admitted at 144 places through the auditorium floor (see arrows). These openings are nine inches long by three inches wide with registered faces set into them, having an aggregate area of 20 square feet of openings.

The fresh air is taken in at the side of the basement (marked *air* on basement plan) and drawn down through a short shaft; from thence it is delivered to the large boxed coils.



The warm air from these coils is then passed between every third joist (which radiate and slope out and upward from the stage) and is delivered through the risers of the steps, upon which the seats are fastened.

The space between the joists through which the warmed air is drawn is lined with a heavy tin casing, flanged through the risers, before the register faces are inserted. A detail of how this is done can be seen in the perspective drawing.

The direct radiation is by long coils placed along the outside walls and under the windows of the main floor and gallaries, to prevent downward cold currents at the walls.

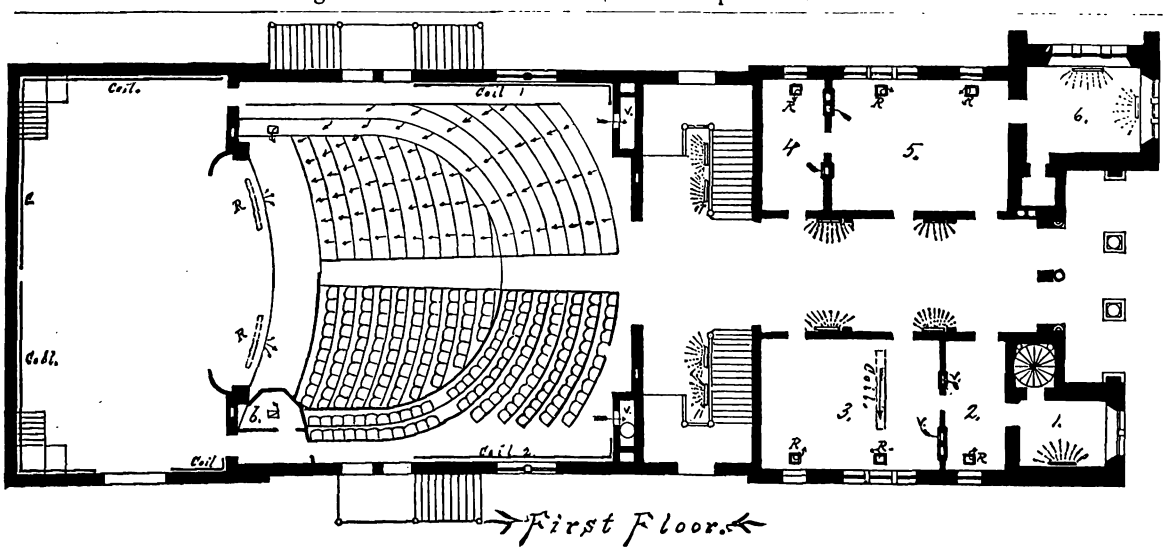
The aspirating shafts have an area in cross-section of 37 square feet. The shaft *c* is warmed by a box coil, placed just above the level of the first gallery, the coil being made to fit the space, so that the air in its upward movement would all have to come in contact with the hot pipes. The shaft on the other side of the building is warmed by the smoke pipe from the boilers passing through its whole length.

The obstruction to the shafts caused by the heating surfaces, reduce their capacity to about 30 square feet. Six registers 21 inches by 29 inches open into each of these shafts, giving an area, when allowance is made for the fretwork, of about 35 square feet.

We are told the velocity of the air at the registers will average 420 feet per minute, which must be equivalent to the moving of the air once every 14 minutes, or about 14 cubic feet of air per person per minute.

In addition to the aspirating shafts, there is in the centre of the ceiling, over the chandelier, an arrangement of nicely disguised openings, aggregating 50 square feet. The air in its escape through these openings is controlled above the ceilng by trap doors operated from the wings.

The stage is warmed entirely by direct radiation, the surface being very large and divided into sections, with a view to keeping the stage and the auditorium at as near the same temperature as possible.



Each private box has its own warm air register, and there are two large direct radiators under the front of the stage, the air circulating from the auditorium in and out again through fretwork.

The Town Hall, 64 feet by 48 feet by 34 feet on the second floor is warmed by three direct radiators and by four indirect radiators, with the air delivered in six places.

The four principal offices on the first floor are warmed by indirect radiation, and the rest of the building, including halls and jail by direct radiation.

Steam is furnished by three of the "Nason" sectional steam generators, two of them being always sufficient for the building, with one in reserve.

The apparatus is what is known as a "Gravity Return" and will work at all pressures.

The size of the mains is shown in the basement plan with the warming of the green room and dressing rooms, which is done overhead.

Other details may be gleaned from a study of the diagrams.

The architect of the building was G. A. Schellenger of New York.

Charles Lavier was the contractor, the work being done under the direction of William J. Baldwin.

It now seems likely that Columbia College will, before very long, provide a special course in sanitary engineering. President Barnard has recently stated that without doubt such a course would be established; "it was a subject of the greatest importance, and one which was felt to be a growing necessity in the institution, as well as by the friends of the institution."

Rats are usually regarded an unmitigated nuisance and destroyers of all plumbing work softer than iron, but Prof. Huxley, in an address before the London Sanitary Protection Society, represented them in the light of sanitary pickets, or inspectors; where a rat could come through, there, certainly, bad air could find entry. He related a case in his own house, where complaint of rats in the basement led to an investigation which showed that the workman who laid a drain under the house had not closed a joint where there was a change of direction, and this had existed for years unsuspected until the appearance of the rats led to its discovery.

Another instance, similar to those we have recently noticed, showing that bad air from heating apparatus is sometimes due not to what the heating men propose, but to what the house occupant disposes, is reported from Chicago. A terrible stench was observed in the Chamber of Commerce building in that city, and an officer of the Board of Health was summoned to find the sewer gas. It was discovered in the heaters where the "bulls and bears" had thrown cigar stumps and spit tobacco juice.

The existence of wells exposed to inevitable pollution is likely to involve Brooklyn in a suit for damages. One John Danaher claims $10,000 for the loss of two of his sons, who, he says, died from the effects of drinking the water of one of the wells. The Commissioner and Dr. Bartley, consulting chemist, for now nearly a year have waged war on these wells, and have closed some thirty of them. His suit will unquestionably bring the City Government to see the necessity of backing up the Health Department more vigorously than ever.

Owing to the accumulation of plumbing and steam heating articles, we have been obliged to omit this week the conclusion of Dr. J. S. Billings' lecture on "Germs and Epidemics."

The total number of houses inspected by the officers of the Sanitary Protection Association during the year 1882 was 362. Of these 21, or 6 per cent., were found to have their drains entirely choked up, and no communication whatever with the sewer; all the foul matter sent down the sinks and soil-pipes simply soaking into the ground under the basement of the houses. In 117 houses, or 32 per cent., the soil-pipes were found to be leaky, allowing sewer gas, and in many cases liquid sewage, to escape into the house. In 137, or 37 per cent., the overflow pipes from the cisterns were led direct into the drains or soil pipes, allowing sewer gas to pass to pass up them, and contaminate the water in the cisterns, and in most cases to pass freely into the house. In 263, or nearly three-fourths of the houses inspected, the waste pipes from baths and sinks were found to be led direct into the drain or soil pipes, thus allowing the possibility of sewer gas passing up them instead of being led outside the house, and made to discharge over trapped gullies in the open air, as they should be.—*The Engineer.*

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A DECISION AFFECTING TENEMENT HOUSES.

The following is the text of the decision of Judge Freedman of the Superior Court of New York City in the action of the Board of Health against Thomas O'Reilly, to restrain the latter from occupying or renting a tenement house until it be made to conform to the provisions of the law respecting such buildings.

SUPERIOR COURT
OF THE CITY OF NEW YORK.

THE HEALTH DEPARTMENT OF THE CITY OF NEW YORK, and another, *against* THOMAS O'REILLY. } *At Special Term.*

Freedman, J.

If the determination of the question whether upon the facts of this case the plaintiff can maintain an action for injunctive relief, depended solely and exclusively upon the language of the statute for the regulation of tenement and lodging houses (ch. 908 of Laws 1867, as amended by ch. 504 of Laws of 1879 and ch. 399, sec. 1 of Laws of 1880), I should not hesitate to hold that the action does not lie, because the acts complained of were for the first time rendered unlawful by the reason of the passage of said statute, and the statute provides for violations of its provisions certain specific remedies which do not include an action for injunctive relief. It is well settled as a general rule that where a statute creates a new offense by making unlawful what was before lawful, and prescribes a particular penalty and mode of enforcing it, or where a statute creates a new right and prescribes a remedy, the statute must be followed, and anyone who attempts to inflict such a penalty, or to enforce such a right, must do so as directed by the statute. But the question always is first of legislative intent and every general rule may have an exception.

The statute applicable to the case at bar constitutes only one of a series of legislative enactments conferring powers upon, and defining the duties of, the Health Department, and as such it must be construed in connection with the other statutes upon similar subjects, and the general grant of powers conferred by the latter. When thus construed it will be found not only that the Health Department has general power to sue and be sued, but also that under ch. 956 of Laws of 1867 it is authorized to institute and maintain a suit for the abatement or remedying of a nuisance; that the word nuisance as used in said act, embraces every public nuisance as known at Common Law or in Equity Jurisprudence, whatever is dangerous to human life, or detrimental to health, whatever building or erection, or part or cellar thereof, is overcrowded with occupants, or is not provided with adequate ingress or egress to or from the same, or the apartments thereof, or is not sufficiently supported, ventilated, sewered, drained, cleaned or lighted, in reference to their or its intended or actual use, and whatever renders the air or human food or drink unwholesome, and that in a suit for the abatement of any such nuisance, injunctive relief may be granted.

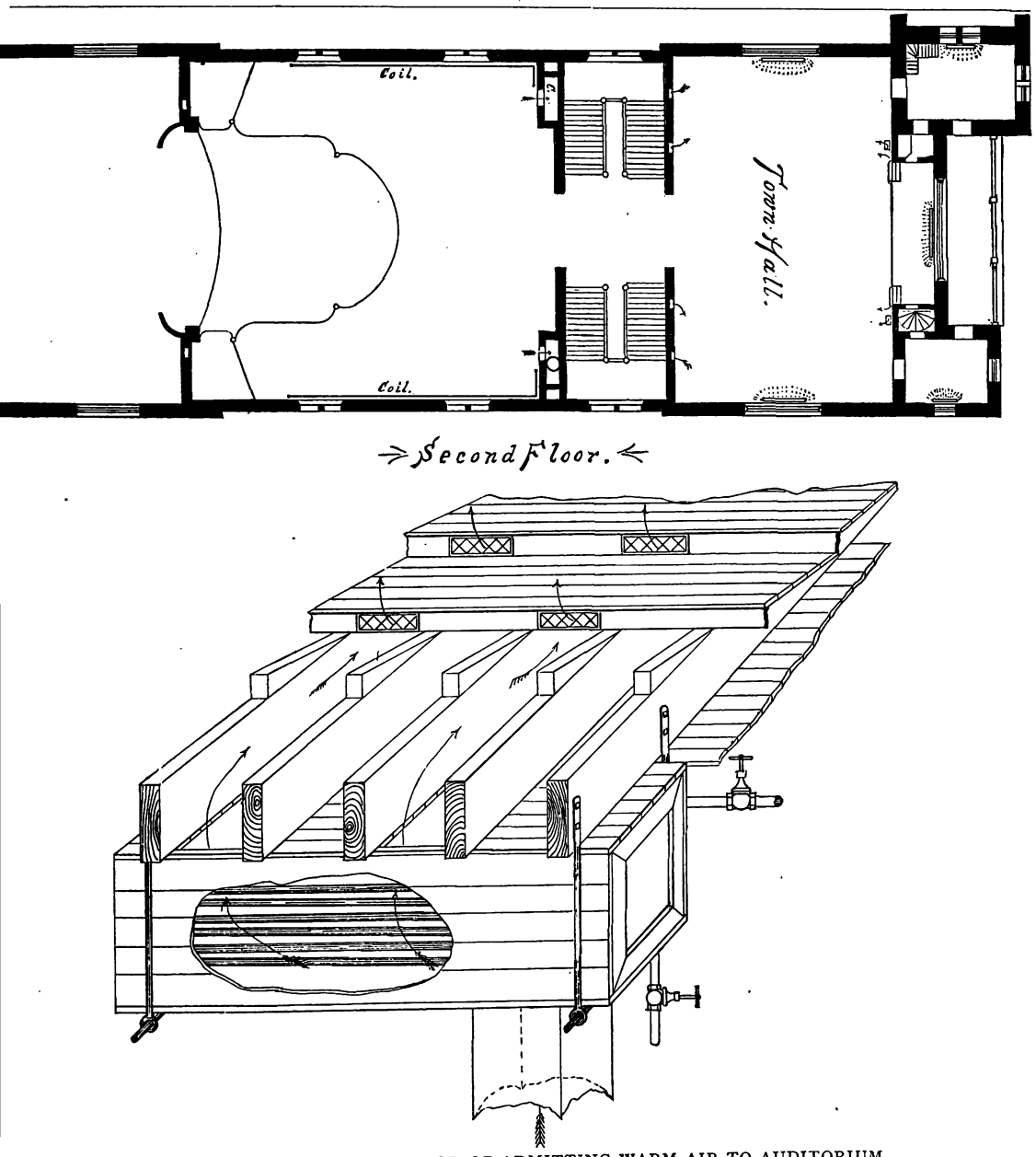
Moreover, it will be found that under Chapter 636 of Laws of 1874 the Board of Health may institute and maintain, in the name of the Health Department of the City of New York, all such suits and proceedings as may be reasonable, necessary and proper for recovering any moneys expended, enforcing any lien or the payment of any fine, the punishment for any offense, or in other respects carrying out the provisions of the law under which it acts.

These powers are quite sufficient to enable the plaintiff to maintain the present action, especially as it is alleged in the complaint, and the proof shows that defendant's tenement house was not only built in violation of the law, but also that it will be deleterious to the health and comfort of the occupants thereof, and that there is no adequate remedy at law to prevent the injurious consequences.

The defendant obtained a permit from the plaintiff for the erection of a five-story tenement house, upon the representations that the size of his lot was 25 x 100 feet, that the size of the building to be erected thereon for the purposes of a tenement house would be 25 x 60 feet, and that there was no additional structure upon the said lot and premises, and the permit was issued to him upon the express condition that no additional structure should be placed upon the lot, except upon plaintiff's approval and a special permit.

The representations were untrue, inasmuch as at the time they were made there was upon the rear part of the lot a three-story building running back to within two feet of the rear line of the lot, and the permit and the statute were violated because the defendant, though he cut the said three-story building down to one containing only one story, left between it and the rear wall of the five-story tenement house a space of only about four feet. Aside from the permit the statute expressly provides that in such a case there must be a clear open space extending upwards from the ground, of at least ten feet between the buildings; and that no house, building or portion thereof shall be used, occupied, leased or rented for a tenement or lodging house unless the same conforms in its construction and appurtenances to the requirements of the statute.

The plaintiff is entitled to judgment: 1. That until the distance between the rear wall of the tenement house to the front wall of the rear building shall, in all respects, have been made to conform to the requirements of the Statute, the defendant and all persons claiming under him and his agents and servants, be enjoined and restrained from using, occupying, leasing or renting the said tenement house, or any part thereof, for the purposes of a tenement or lodging house; and 2. That the plaintiff recover the costs of the action.



DETAIL ILLUSTRATING METHOD OF ADMITTING WARM AIR TO AUDITORIUM.

A COMPETITION OPEN TO JOURNEYMEN PLUMBERS AND GAS FITTERS.

A good thing is done by Mr. T. J. Byrne, a plumber of this city, in his offering three prizes to journeymen and apprentices for the best essays on certain subjects connected with their trades. A gold medal is to be awarded to the journeyman plumber or apprentice who designs the best set of drawings of the plumbing of a building or dwelling; a silver medal to the journeyman plumber or apprentice who writes the best essay on sanitary plumbing, and a bronze medal to the steam and gas fitter or apprentice who prepares the best essay on gas fitting and steam heating, with drawings.

The Hydraulic and Sanitary Plumber, of which Mr. Byrne is one of the editors, publishes the terms of the competition, which are as follows:—

1st. The gold and silver medals to be open to every journeyman plumber and apprentice. No one not an accredited journeyman or apprentice will be qualified.

2d. The bronze medals to be competed for only by gas fitters and steam heaters and apprentices, and no one else.

3d. The drawings must be made by the person whose name accompanies the work. The essays to be thoroughly original, and to be in the handwriting of their respective authors.

4th. Competition will be open until September 1, 1883, after which the date entries will close.

5th. A drawing will be made only upon one side of the paper. Copy to be written only on one side of the sheet. Black ink to be used in all cases.

6th. All drawings and essays intended for competition should be addressed "Personal" to the "Editor of *The Hydraulic and Sanitary Plumber*." In one corner and on the face of the envelope, should be marked clearly, to prevent confusion, "Prize Drawing" or "Prize Essay," whichever it may be. Particular attention should be paid to this clause, as matter coming to us not marked "Prize Drawing" or "Prize Essay," will be regarded as for the paper, and will be treated accordingly.

7th. All prize communications must be signed with a fictitious name. The writer's real name must be written on a card with his fictitious name written underneath. This measure is taken to insure fairness in decision, and prevent confusion in signatures—fairness in that no one shall see or know the real author but the editor of the paper until the decision is made; confusion in that several persons may adopt the same signature.

The judges will consist of Master Plumbers of New York, Brooklyn, Jersey City and Chicago. Decisions shall be made by the first of October, or as nearly thereafter as practicable. The winning designs and essays to be published in *The Hydraulic and Sanitary Plumber*, together with such other essays worthy of especial mention by the judges.

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Correspondence.

SYPHONAGE OF THE MAIN TRAP.

BOSTON, *March* 1, 1883.

To the Editor of THE SANITARY ENGINEER.

In answer to your correspondent "W." let me say, it was not intended that any printed report, at all, should appear, of my paper, as the whole sum and substance of it was likely to be published more fully in detail for general circulation, in a few weeks.

While it is true that the running trap at times is syphoned, yet it was not the aim of the paper to point out this fact other than casually, but rather to call attention to the frequent *forcing* of running traps, by back pressure, and the disagreeable "puffing" of fresh air inlets, and the possible danger of transmitting contagious diseases in this way.

Technical letter press is apt to be somewhat confused when reprinted, and if taken down originally by a reporter, may not be strictly according to fact, in the first instance; if "W" will wait patiently a few weeks he shall be furnished with a printed copy of what was actually stated, which I trust may be less involved and more interesting.

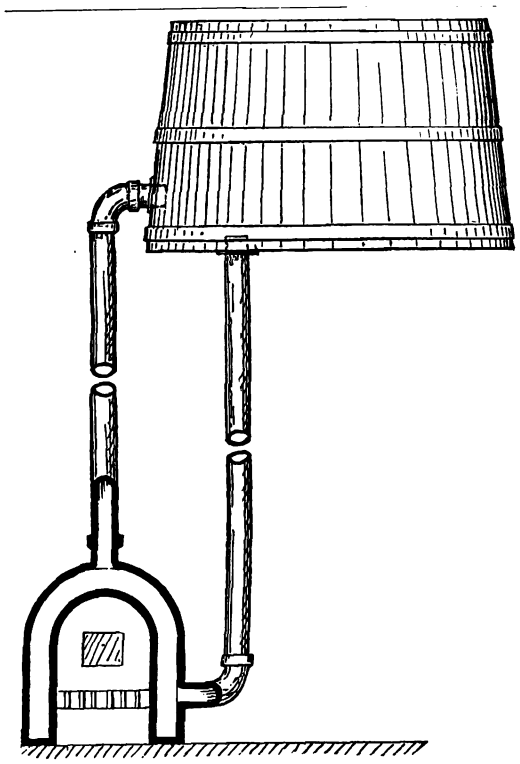
Very truly, ERNEST W. BOWDITCH.

HEATING A TANK.

DETROIT, MICH., *March* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

A circular tank with flaring sides measuring 4' 3" on bottom, 3' 7" on top and 3' 8" perpendicular height, is used here by laundry for washing purposes. It stands on roof and is housed in. It is supplied by city water, which runs in over top connected with ball and cock. At present it is heated by steam. Wish to do away with steam and heat by stove and coil or some other hot water apparatus. From bottom of tank to floor directly beneath, upon which



the stove will stand, is 13' 6". What or how much heating surface in coil is needed to heat this tank full twice a day to 200° F.? An early answer in your paper will greatly oblige A SUBSCRIBER.

[Your tank will hold about 2,800 pounds of water, which if warmed from 40° to 200° F. (twice in ten hours) will require 896,000 *heat units*—89,600 *heat units* per hour; equivalent to the evaporation of about 1½ cubic feet of water per hour. A greenhouse boiler of from 25 to 30 square feet of surface will do. Connect it as shown in diagram.]

ARTESIAN WELLS IN NEW YORK CITY.

NEW YORK, *March* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

Please give me some information, through the columns of your good paper, regarding any artesian wells that have been sunk on Manhattan Island, such as their number, location, depth, and character of the water. W.

[In THE SANITARY ENGINEER of Oct. 12, 1882, (Vol. VI. page 401) it was stated, on the authority of Mr. C. W. Marsh, that there were 46 bored wells on Manhattan Island, varying in depth from 26 to 2,000 feet, 18 being more than 500 feet deep. The diameter was stated to vary from 2½ to 10 inches, the majority being 6 or 6½ inches, and the capacity to range from 2,000 to 126,000 gallons per day. The temperature of the water, so far as noted, was between 50° and 59° F. We believe the number at present is somewhat greater than this—in the neighborhood of 60, we think. A large proportion, if not the majority, are found at the breweries, where the water is used for cooling on account of its lower temperature than the Croton. The most extensive borings, we believe, have been made at Ehret's, 92d street and 3d avenue. Dr. C. F. Chandler is authority for the statement that the water from such wells can never be free from danger if drank before being boiled. The geological formation renders it impossible, he says, for water to come in from beyond the limits of the island, except, possibly, in one locality for a short distance south of the Harlem river. It is only filtered surface water, he says, and however clear it may be, it is always in danger of containing disease germs which cannot be filtered out by the soil.]

PIPES FROM WATER CLOSET RECEIVERS.

To the Editor of THE SANITARY ENGINEER:

I notice that you often recommend running the vent pipes from receivers of water closets to heated flues, and publish descriptions of work where such system is indicated. I suppose by heated flues are meant usually chimney flues, and I would like to inquire whether this practice is not attended with some risk. If the pipes from several water closet receivers on different floors were run, as would likely be the case, into the same heated (chimney) flue, and that flue had, as is also likely to be the case, another opening, fireplace or stove pipe hole, beside that from kitchen range, usually relied on to keep it hot, then there would be the risk of the accumulated bad air from the receivers coming out at that opening; especially in case of reversals of the draft, which you have frequently called attention to.

Therefore, I would suggest that the direction to run pipes from receivers to heated flues should be so qualified as to mean to flues heated by gas jets or otherwise, for that special purpose, or if to a chimney flue then to one which has no opening above the basement.

Yours, very truly, H. V. D.

[Your suggestion is a pertinent and proper one.]

DOUBLE BOILERS.

To the Editor of THE SANITARY ENGINEER:

Will you kindly give me your opinion on the statement and plan of the fitting of a private mansion. I intend fitting the house up double from street and tauk. It is a four story building, there being on the top-floor a sink, the third floor, bath, closet and wash basins, and on the second floor the same, on first floor boiler sink. I would like to have it so arranged that in case the water does not raise to the second story, by means of a cut off. I can supply from tank on plan of a double boiler, the two lower floors to be supplied from street pressure. Hoping that you will give me your idea of the same in your next issue. I remain,

A Constant Reader of THE SANITARY ENGINEER.

Will you please give me the name of a good book on plumbing and also the price.

[You will find a description and illustration of the manner of fitting up a double boiler in an article by "Sanitas," page 288, issue of May 15, 1881. The cut-off is shown on page 303, issue June 1, 1881. The description of the work in the houses of Messrs. Bishop, Sloane, Vanderbilt and others that appeared in THE SANITARY ENGINEER last year, will also give considerable information on this point. The publisher of this paper sells several books on plumbing but we know of none that describe the double boiler system as practised in this city aside from the bound volumes of THE SANITARY ENGINEER.

The following books are on plumbing: The Plumber and Sanitary Houses (Hellyer), $4.00; Lectures on the Science and Art of Sanitary Plumbing (Hellyer), $2.00; and Mr. Paul Gerhard's, House Drainage and Sanitary Plumbing, $0.50; On drainage, Mr. E. S. Phillbick's American Sanitary Engineering, $2 00.]

To the Editor of THE SANITARY ENGINEER:

I would like to call your attention to this statement by an architect who furnishes to a Western board of health a plan and description of plumbing as he does it. He says:

"None of the traps are ventilated, as I do not consider it essential, except when necessary to prevent syphonage."

Now I would like to ask, what conception this architect can have of the requirements of plumbing to qualify him to instruct the public? W.

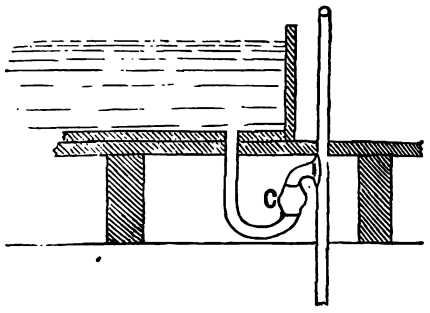
["We give it up."]

VERTICAL CHECK-VALVE.

NEW YORK, *March* 8, 1883.

To the Editor of THE SANITARY ENGINEER:

In placing a check-valve on the supply pipe from a house tank, as arranged in the drawing of John Newell, in your issue of Dec. 7, 1882 (vol. VII. page 9), would it not be better to take the pipe down first and then turn it back like a half S-trap, as shown in the accompanying sketch, so that a vertical check may be used, as at *C*? Is not a vertical check less liable to get out of order than a horizontal one? B.



[We think it is, though if a trap like this be used, a trap screw should be put in so that the water could be drained out, in case the tank was emptied or there was a liability of freezing or stoppage from sediment.]

SEPARATE SYSTEM OF SEWERAGE.

LAWRENCE, *March* 7, 1883.

To the Editor of THE SANITARY ENGINEER:

Is there any recent work on the "Separate System of Sewerage" giving method of calculation for sizes of mains, etc. I have seen a notice of a "Diagram for Sewer Calculations," by W. P. Gerhard, published by Spon, represented as indispensable to those about to adopt the separate system. Can you tell me anything as to the value of this work? A reply to this at your earliest convenience would be gratefully received. Yours, A. D. MARBLE,
City Engineer.

[There is no book, so far as we know, giving the mode of computing sizes of sewers specially for what is called the separate system. The publications concerning this "system" have been chiefly devoted to general argument. Any table of the flow of water in pipes or sewers will do for this purpose, by making the proper allowance for the proportion of quantity discharged to the area whence it is derived. Where rain water is excluded from sewers, the maximum flow to be provided for may be assumed in a closely built up street in a town with a copious water supply to amount to three cubic feet per minute for every thousand linear feet of street sewered. For practical reasons the smallest sewer used so far has been of six inches diameter, and this may be considered the limit of size. The smallest amount provided to be removed, if rainfall is admitted to the sewers, has been assumed to be equivalant to a rainfall of one-fourth of an inch per hour, which, on 1,000 linear feet of street, 60 feet with lots 100 feet deep fronting on it, would amount to a flow of 90 cubic feet per minute. Any table of sewer sizes, computed for taking in rainfall, may be used for obtaining the sizes of separate sewers by assuming the quantity to be disposed of as one thirtieth of that allowed for in the tables.

The diagram mentioned is a very convenient one for sewer calculations of any sort, and it is believed to correctly represent the results of one of the best formulæ for flow in pipes.]

PLUMBING LAW VIOLATIONS.

Nine violations of the plumbing regulations were reported at the Health Department of this city during the past week—all of a trivial nature—as follows: By Inspector Hollick three, and by Inspectors Eagleson, Golden and Hooper, two each. No cases proving to be of a serious nature were reported. No cases were submitted to the attorney.

Inspector Berry reported three violations of the light and ventilation law—all consisting of failures to submit plans.

The New Orleans "*Times-Democrat* Almanac" for 1883 is compiled especially for Southern readers to whom its commercial and political information concerning the Southern States will be of much use. It is well illustrated, has much carefully selected general information, and will be welcomed at a counting room desk or a family table.

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THE BOSTON PLUMBING ORDINANCE.

The following is the text of the ordinance regulating plumbing in the city of Boston, which passed the City Council the 16th inst., and has received the Mayor's signature. We defer editorial comment until our next issue.

"SECTION 1. No person shall carry on the business of plumbing unless he shall have first registered his name and place of business in the office of the Inspector of Buildings, and notice of any change in the place of business of a registered plumber shall be immediately given to said Inspector.

"SECT. 2. Every plumber, before doing any work in a building, shall, except in the case of repairs or leaks, file at the office of the Inspector, upon blanks to be provided for the purpose, a notice of the work to be performed; and no such work shall be done in any building without the approval of said Inspector.

"SECT. 3. Every building shall be separately and independently connected with the public sewer, when such sewer is provided; and, if such sewer is not provided, with a brick and cement cesspool of a capacity to be approved by the said Inspector.

"SECT. 4. Drains and soil-pipes through which water and sewage is used and carried shall be of iron, when within a building, for a distance of not less than five feet outside of the foundation walls thereof. They shall be sound, free from holes and other defects, of a uniform thickness of not less than $\frac{1}{8}$ of an inch for a diameter of four inches or less, or $\frac{5}{32}$ of an inch for a diameter of five or six inches, with a proportional increase of thickness for a greater diameter. They shall be securely ironed to walls, laid in trenches of uniform grade, or suspended to floor-timbers by strong iron hangers, as the said Inspector may direct. They shall be supplied with a suitable trap, placed, with an accessible clean-out, either outside or inside the foundation wall of the building. They shall have a proper fall towards the drain or sewer, and soil-pipes shall be carried out through the roof, open and undiminished in size, to such height as may be directed by said Inspector; but no soil-pipe shall be carried to a height less than two feet above the roof. Changes in direction shall be made with curved pipes, and connections with horizontal pipes shall be made with Y branches.

"SECT. 5. Rain water leaders, when connected with soil or drain pipes, shall be suitably trapped.

"SECT. 6. Sewer, soil-pipe or waste-pipe ventilators shall not be constructed of brick, sheet-metal, or earthenware, and chimney-flues shall not be used as such ventilators.

"SECT. 7. Iron pipes, before being put in place, shall be first tested by the water or kerosene test, and then coated inside and out with coal-tar pitch, applied hot, or with paint, or with some equivalent substance. Joints shall be run with molten lead and thoroughly calked and made tight. Connections of lead pipes with iron pipes shall be made with brass ferrules, properly soldered and calked to the iron.

"SECT. 8. Every sink, basin, bath-tub, water closet, slop-hopper, and each set of trays, and every fixture having a waste-pipe shall be furnished with a trap, which shall be placed as near as practicable to the fixture that it serves. Traps shall be protected from syphonage or air-pressure by special air-pipes of a size not less than the waste-pipe; but air-pipes for water closet traps shall be of not less than two-inch bore for thirty feet or less, and of not less than three-inch bore for more than thirty feet. Air-pipes shall be run as direct as practicable, and shall be of not less than four-inch bore where they pass through the roof. Two or more air-pipes may be connected together or with a soil-pipe; but in every case of connection with a soil-pipe, such connection shall be above the upper fixture of the building.

"SECT. 9. Drip or overflow pipes from safes under water closets and other fixtures, or from tanks or cisterns, shall be run to some place in open sight, and in no case shall any such pipe be connected directly with a drain, waste-pipe, or soil-pipe.

"SECT. 10. Waste-pipes from refrigerators or other receptacles in which provisions are stored, shall not be connected with a drain, soil-pipe, or other waste-pipe, unless such waste-pipes are provided with traps, suitably ventilated, and in every case there shall be an open tray between the trap and refrigerator.

"SECT. 11. Every water closet, or line of water closets on the same floor, shall be supplied with water from a tank or cistern, and the flushing pipe shall not be less than one inch in diameter.

"SECT. 12. Pipes and other fixtures shall not be covered or concealed from view until after the work has been examined by the said Inspector, and he shall be notified by the plumber when the work is sufficiently advanced for inspection.

"SECT. 13. Plumbing work shall not be used unless the same has first been tested by the said Inspector with the peppermint, ether, or water test, and by him found satisfactory.

"SECT. 14. No steam-exhaust shall be connected with any soil or waste pipe, or drain which communicates with a public sewer.

"SECT. 15. Water pipes in places exposed to frost shall be packed with mineral wool, or other substances equally good, and they shall be cased to the satisfaction of the said Inspector.

"SECT. 16. A grease trap shall be constructed under the sink of every hotel, eating house, restaurant, or other public cooking establishment.

"SECT. 17. The provisions of Sections 3-13, inclusive, and of Section 15 of this ordinance, shall apply only to buildings erected, or to work performed, after its passage."

NOTES FROM CHICACO.

[From our Special Correspondent.]

The semi-monthly meeting of the Master Plumbers' Association of Chicago, held Thursday evening, March 15, was presided over by David Rock, T. C. Boyd, Acting Secretary. About thirty attended, and unanimously approved the following two committee reports:

"Your Committee appointed for the purpose of taking measures towards forwarding a correspondence with our fellow tradesmen in New York, met at the rooms of the Master Plumbers' Association on Tuesday, March 12, at 2 P.M., and adopted the following resolutions:

"I. That the Master Plumbers Association of the City of Chicago are in hearty sympathy with all movements that shall be taken to advance the interests of our fraternity.

"II. That a national society should be organized as soon as possible.

"III. That the Corresponding Secretary be instructed to correspond with the New York Master Plumbers' Association, informing them of our progress as a Society.

"IV. In order to bring to a closer relationship the Master Plumbers doing business in surrounding towns tributary to Chicago, we, the Committee, desire that the Corresponding Secretary be instructed to invite them to become members of our Association."

The second approving vote was on the following sensible and timely card to the public:

"The Sanitary Committee respectfully suggest to our citizens that now is the proper time to clean catch basins by removing from them the accretions of decomposing matter always found at this time of the year. You get the advantage of the spring rains for a thorough flushing, leaving the catch basin in good condition for the advent of hot weather. We also suggest, where practicable, the necessity of providing, for ventilation of the catch basin, a 4 x 4 wooden flue. Carried up from the basin eight or more feet, it could be attached to the cover of basin; or a metal pipe, carried up on the wall of the building above the roof, would be of advantage as a measure of health."

DRAUGHTS OR SLOW POISON.

After all that has been said and done about the so-called "ventilation" of our public rooms, the people who frequent them are still shut in, in nine and a half cases out of ten, to a choice between taking poison and getting a chill—with the facilities much greater for the former. The average assembly room is still typified by the "hot air receiver" in which Adirondack Murray was once lecturing. It was built in the regulation fashion, with close walls on two sides, pierced in four places with small openings into dead-air flues, called, by a fiction of the architect, "ventilators," but up or down which no current was ever known to pass. The ceiling was, of course, solid, and the only chance to let in fresh air to the thousand people who were trying to keep up their heart and brain action on an atmosphere composed of lung exhalations, burnt-up air, and unconsumed gas, was to let down the large windows in the end. Up and down went the rattling sash and rustling curtains, as the gaspers and the freezers took turns at the windows. Finally, the lecturer stopped and said, with the coolness and humor that characterized him: "Friends, you may fix the windows anyway to suit yourselves; only, if I am to finish my lecture, I should like to have them stay fixed, one way or the other. For myself, if I am to have a choice between freezing to death or suffocating, I should prefer the former method as being the cleaner. But, if the world stands for another year, and this dreadful hall with it, and you are to have another course of lectures, I would advise you to punch a hole through that roof," indicating the highly frescoed ceiling with his superb gesture.

The process hinted at in this rough suggestion has been followed in many of our pretentious halls and theatres. The builders have "punched a hole through the roof," in a more or less ingenious and artistic fashion; but, in thus providing an escape for the bad air, they have exposed a large percentage of the occupants of the room to direct or cross currents of air every time a lobby door is opened or a window is raised. There is yet no science of ventilation; or, if there be, it has not been applied where it is most needed. Many fairly effective devices for taking the overheated air out of a room have been invented; but the rooms are rare into which any adequate supply of pure air is introduced. The furnace fiend in the cellar will belch his blighting breath into a room as fast as it can find a way out—and too often faster, as the baked brains and laboring lungs can testify. But a rational system of ventilation, based upon the law of demand and supply, and avoiding stagnation on one hand and draughts upon the other, has not yet been brought within the reach of the general public. People susceptible to the insidious effects of foul air, and who visit places of public amusement, know what a "theatre headache" is. They have a reminiscense of the taste of the atmosphere in their mouth the next morning, though they may not know what it is. Of all places in the world, except sleeping or thinking rooms, where pure air is needed a public dining room is the oftenest neglected in this particular. Added to the heat of the furnace or the steampipes, is the smoke of the gas and the scent of the dishes, and sometimes the fumes of the kitchen. In onr grand hotels, elegant and perfect in all their other appointments, there is often—we may say commonly—no way of reducing the temperature and freshening the air except by lowering a window—with what effect Mr. Fitz feelingly hinted in the humorous speech to which we alluded in the opening. It destroys half the enjoyment of a good dinner to introduce pure air in this fashion, merely as an *entrée* in the elaborate *menu*. One does not want to carry away incipient pneumonia or an aggravated catarrh as the penalty for dining away from home.—*Boston Herald.*

REGULATION OF PLUMBING IN TORONTO.

Much of the plumbing done in Toronto is very poorly done. When new houses are erected, the result of bad plumbing is very unsatisfactory to the occupants, and in many cases leads to sickness and death. From a sanitary point of view, it would be well for the plumbing done in Toronto to be controlled by legislative enactment. Plumbers should be required to submit themselves to an examination, and s' ow that they are capable of carrying out their contracts in a proper manner. The best way to do would be for all plumbers to lay the plans of the plumbing to be done in new buildings before the City Commissioner—before whom the plans of all buildings should be laid—so that the sanitary necessities of the city could be supplied, and the health of the people protected from fevers caused by bad drainage and imperfect plumbing.—*Toronto Telegram.*

The *Telegram* is quite right. Plumbing should be under the control of municipal authority. The enforcement of the plumbing regulations in this city has been of inestimable value. If Toronto will send a delegation to this city to investigate the methods employed by our city Health Department, and adopt similar regulations for the control of her plumbing, there will not remain such just cause for complaint.

Governor Cleveland, of New York, has signed the tenement house cigar bill, prohibiting the manufacture of cigars in apartments or rooms used as dwellings, except the first floors of tenements in which are stores where cigars are kept for sale. The bill becomes a law Oct. 1.

The New York County Medical Society have taken steps to establish a hospital for scarlet fever, diphtheria and measles in this city.

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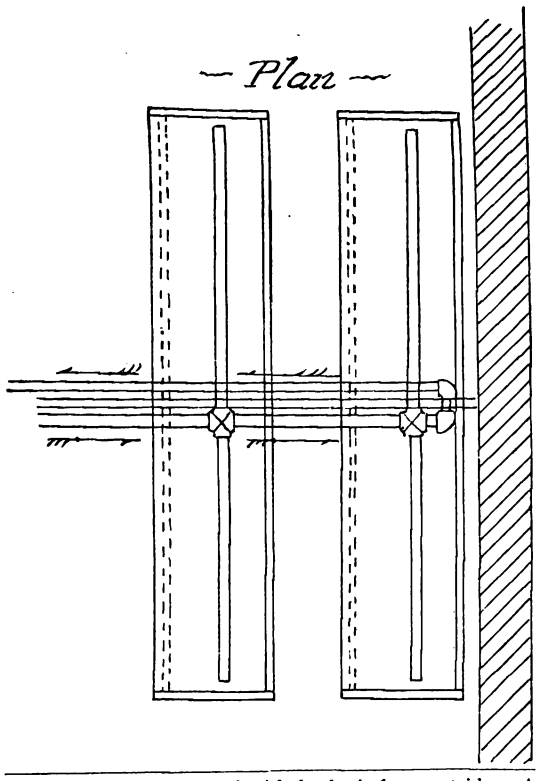
WARMING A CHURCH.

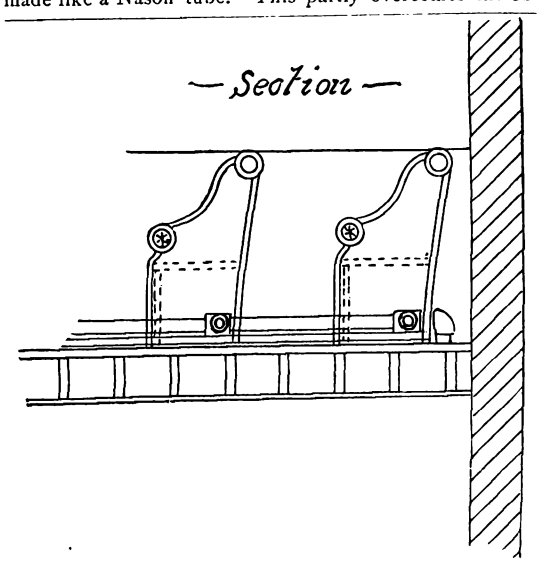
CHICAGO, *March* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

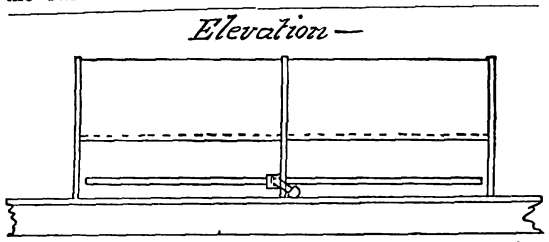
The plan of church warming described on page 294 of last number is not new nor uncommon in this vicinity. One church here has used that system for 23 years. I have also seen it used in connection with small holes in the floor



under the pipes connected with fresh air from outside. A better plan, I think, is to run a single pipe on the floor to front end of church either in basement or on one side of partition between seats (see sketch), thence back on the other side with branches of one inch pipe for each seat made like a Nason tube. This partly overcomes the ob-



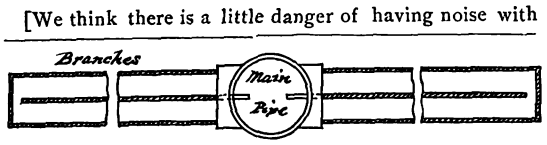
jection of having too much heat in the pews. I have another plan for warming and ventilating churches (where the basement is not used for class rooms, etc.) that is



superior to anything I have seen. When I can spare the time I will send you a description and sketch.

Yours truly, L. HAMLIN.

[We think there is a little danger of having noise with



this plan unless the heating pipe both ways from the Tee pitched slightly upward as shown by the dotted line—a detail of course.

We will be glad to see your *better plan.*]

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
March 17....	27.11	19.40	21.03	28.08	29.63	18.45

E. G. LOVE, Ph.D., *Gas Examiner.*

ELECTRIC LIGHT NOTES.

City Councils of Philadelphia the 15th inst amended the ordinance to permit the Baltimore and Ohio Telegraph Company to place wires through the city so that the company is required to lay the wires underground in the built up portions. The mayor has made it known that he will veto any ordinance granting the right to erect poles in the streets.

The New York *Times* fears that a job is behind a scheme which was rushed through the Board of Aldermen with great haste last week giving the New York Electric Lines Company permission to open the streets for laying wires underground. A clause in the ordinance requires the company to pay to the city 2 per cent. of its gross receipts, and another forbids the company to transfer its franchise without consent of the Common Council. The incorporators are Sidney F. Shelbourne, William Force Scott, Geo. L. Weed, Herbert P. Brush, and Edward Barr.

Capt. F. U. Greene, U. S. Engineers, after inspection of systems of underground electric wires in Boston and New York, is in favor of prohibiting the further erection of poles in Washington. He recommends that experiments be made with the fire alarm wires to test an underground system less expensive than those now usually employed, and he recommends that estimates be submitted to the next session of Congress for placing all fire alarm wires undergronnd, and a bill be prepared compelling all electric wires to be put undergronnd at an early date.

The *Mechanic* states, on authority of Postmaster General Fawcet, that within a radius of four miles of the general post office in London there are 4,388 miles of wire underground, besides 600 miles of private wires.

According to the London *Telegraph*, M. Marcel Duprez has transmitted power to long distances with success by aid of electricity. Upward of three-horse power was first transmitted a distance of twenty kilometres, and then thirty-five kilometres, by means of an ordinary wire four millimetres in diameter. The proportion between the forces expended and received was 50 per cent.

A meeting of the trustees of Columbia College was held the 13th inst. to consider the establishment of a school of electrical engineering. Mayor Low, of Brooklyn was delegated to confer with the electric light, telegraph and telephone companies on the matter. President Barnard, says the *Times*, states that representatives from some of the companies had expressed themselves in favor of the school, and the committee therefore decided that if these companies would give the plant to begin with, and guarantee the sum of $12,000 per annum, Columbia would organize the school, furnishing its own professors, as far as possible, and appointing a Professor of applied electricity or electric engineering with such attendants as were necessary.

A company has been formed in Newark, N. J., under the title "The American Electric Storage Company," to push the inventions (patents on storage batteries) of Nathaniel S. Keith, of this city.

Mr. F. W. Whiting, in the employ of the Boston Manufacturers' Mutual Insurance Company, recommends as a means of obviating the trouble caused in cotton and woolen mills by generating electricity by the friction of the belts and pulleys, that a wire be attached to a carding machine and carried to a gas or water pipe.

Meter-ites.

A New Jersey company have a furnace which, they claim, burns without smoke. The draft is produced mechanically by a fan. When coal is put on the fire the door under the grate bars is closed, allowing no air to enter, and the coal is baked as in a gas retort, the volatile gases distilling over into a second chamber with an arrangement like an argand burner. Air is drawn in through at opening in the bottom of the second chamber and circulates around the walls of the chamber, and is then drawn in through a circle of holes meeting the gases evolved in the first chamber, producing complete combustion.

The *Journal of The Society of Arts* describes the coal fields of New Zealand. The principle deposits are near the Molyneux river in Otago, in the South Island, extending 50 miles. This district is estimated to contain 100,000,000 tons of accessible coal; near Dunedin is another capable of yielding the same quantity. Another great coal area is on the western seaboard of Otago. The total yield in 1880 of all the New Zealand mines was 299,923 tons.

The *Water Gas Journal* says: "Owing to the large amount of pure oxygen and hydrogen contained in the Lowe water gas, it can be burned in much larger volumes, without smoke, than is the case with coal gas." It is a misfortune for any illuminating gas to contain "pure oxygen," and we doubt if the advocates of the Lowe process would endorse the statement. When light is wanted the oxygen for the combustion of the gas should come from the outside, and should not be mixed with the gas before combustion.

Food and Drugs.

NEW YORK ADULTERATION LAW.

The meeting of the State Board of Health, which we reported in our last, developed several features worthy of more than passing comment. It was quite a representative meeting, and might be considered in many ways unique. We saw adulteration fully represented, and for once it came out in its true colors. The peculiar feature which must strike all was the apparent interest some of these manufacturers of adulterated food would have us believe they take in the welfare of this State. If the law is to be administered as the Board have decided, the capital which is now employed in manufacturing those fabrications would be transferred from this State to another. Can it be possible that these New York adulterators imagine they will obtain by means of threats concessions contrary to the spirit of the adulteration act from the Board of Health? If so, we believe they will be much mistaken. The duty of the Board is to carry out the letter and spirit of the act. As representatives of the people, they must do it with an unfaltering hand. To do this they must protect the consumer, and in doing so they at the same time protect the honest trader. As we have said again and again, sooner than the law should bend to suit the convenience of these manipulators, let them go and seek fresh fields and pastures new.

When the administration of this act gets into working order and is carried out in a proper spirit, the result must be highly beneficial to the health of the people and to honest traders. It will no longer pay to manufacture cream of tartar containing 92 per cent. of gypsum. Manufacturers will have to make a pure article, or, as we have said before, seek fresh fields and pastures new. The law will deal with these manufacturers in such a manner as to render it profitless. Let all persons interested in the health of the people and honest trading render every assistance to the Board to carry out the act in its entirety until it may be said of these adulterators—

"Othello's occupation's gone."

—*American Grocer.*

A NEW METHOD OF WATER INVESTIGATION.

Dr. R. Angus Smith, whose investigations into impurities of water and air in connection with his work under the Alkali Acts have been of great interest and value, calls attention to a new method of testing drinking water, which he thinks promises to be of great practical importance, more so, in fact, than the chemical methods heretofore employed, although these last cannot be neglected.

This method consists in the use of gelatine very much as it is employed by Dr. Koch in his culture experiments.

Gelatine, dissolved in a little water, is mixed with the water to be tested to such an extent that the gelatine solid amounts to 2½ per cent. of the mixture. This forms a transparent mass in which the results of the development of any organisms in the water can be readily observed. Each active point manifests its presence for the formation of a little sphere in the gelatine, so that for a time, at least, the results are preserved and can be easily recorded.

The water must not have too much gelatine in it, if so the action is stopped. It must not have too little, if so the gelatine becomes liquid too soon and the action of the individual centres is not observed.

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When a centre acts it makes around it a sphere in some waters, and the sphere, which has the appearance of a thin vesicle, is filled with liquid. These spheres form in a day or two, according to the water, and at the bottom is a white mass, containing active bacteria chiefly. The liquid filling the spheres may be taken out by a pipette and examined, as also the bacteria which lie at the bottom. The striking amount of spheres and gas bubbles in some cases render the examination of water by this method less dependent on the spirit of the operator, and a photograph may be taken of each specimen and the result preserved as evidence.

In certain specimens of Manchester supply the spheres appear on some days very few, on other days the amount is enormous and heavy, the whole of the tube in which the experiment is made being filled with spheres. At such times the water is highly impure and complained of by the public.

Of course, so far as this test is a quantitative, *i. e.*, as to the number of spheres developing in a given time, it is one for the number of organisms present. Some of them will be present in all ordinary water, and, therefore, the occurrence of the spheres is no proof that the water is unwholesome, although as a rule the fewer there are the better is the water. Nevertheless, entire absence of these spheres may be due to superabundance of organisms or to want of air. In one case Prof. Smith found a water which gave no bacteria except on the surface, but when air was compressed over it to the extent of above three atmospheres, the spheres became abundant.

In sewer water the spheres do not appear, but the whole mass becomes turbid and the gelatine soon liquefies.

The most important thing about the new method is the power which it gives us to determine with precision the effects of different kinds of organisms, when supplied with different kinds of nutriment and kept at different temperatures, etc., and there is reason to hope that in this way we may be able to distinguish the disease producing organisms from others, and to say whether a given specimen of water, for example, does or does not contain the specific cause of typhoid fever.

Prof. Koch is working at this subject, and we hope that it will be thoroughly tested by some of our own observers.

SMALL-POX IN NEW ORLEANS.

The New Orleans *Times Democrat*, of March 2, contains an interesting account of the proceedings of a meeting called by the Executive Committee of the New Orleans Auxiliary Sanitary Association for the purpose of conferring with the ministers of the various colored congregations in the city with reference to means to be adopted for checking the spread of small-pox.

By a report presented by Dr. Watkins it was shown that since the beginning of 1883 there have occurred in New Orleans 187 deaths from small-pox. About one-fourth of the population of the city is colored, and the number of the deaths from small-pox was 122. In other words, the mortality from this disease is nearly eight times as great among the colored population as it is among the whites. The chief cause for this is stated by Dr. Chaillé to be the want of vaccination among the colored people, the estimate being that about 15,000 of this class are at present unprotected by vaccination.

The representatives of the colored population present at the conference unanimously expressed their willingness to do everything possible to aid the Association to carry out its plans for securing vaccination among the poor and ignorant, and it was decided that the colored ministers should urge the matter upon their several congregations, upon the following Sunday.

This is true, practical missionary work.

By way of contrast the same paper contains an account of the action of the Louisiana Board of Health, the result of which was the passage of the following resolutions:

"WHEREAS, a petition of citizens has been presented to this Board, having for its principal object a repeal of the resolutions in relation to the New Orleans Auxiliary Sanitary Association, adopted unanimously by this Board at its session Dec. 14, 1882, and

"WHEREAS, grave reasons then existed, and still exist, for the passage of the aforesaid resolutions, having their origin in the legislation and operation of the New Orleans Auxiliary Sanitary Association; and

"WHEREAS, the State Board of Health of Louisiana has no desire to retain said resolutions upon their records when the causes which gave birth to them are removed; be it therefore

"*Resolved*, That the State Board of Health of Louisiana will agree to rescind said resolution when the New Orleans Auxiliary Sanitary Association shall have adopted the following:

"1. The repeal of the resolutions adopted by it, indorsing the National Board of Health, and urging its perpetuation.

"2. The adoption of a resolution indorsing and sustaining Louisiana's legal health representative and guardian, the State Board of Health, to which they profess to be auxiliary."

Knowing nothing of the local politics of New Orleans we do not understand the precise influences by which such a board of health retains its position, but among them may certainly be counted almost unlimited bluster and cheek.

We suppose the time will come when the respectable citizens of New Orleans will have this board in some way suppressed. At present its existence is a constant menace to the commercial and sanitary interests of the city.

THE ANNUAL REPORT OF THE BOARD OF HEALTH OF THE CITY OF NEWARK, N. J., for the year ending Dec. 31, 1882, is a pamphlet of 16 pages, prepared and signed by Dr. F. B. Mandeville, the Health Physician of the City.

It states that "the Board have administered the sanitary laws and regulations with moderation, prudence and efficiency" which we do not in the least doubt, but we must confess that we should like to have seen some evidence of it presented in the report. We are told that most careful attention has been given to the milk supply, that a milk inspector was appointed, and that when he began he could hardly find any milk that was up to the standard, but that now he can hardly find any below it. Now, we should very much like to have the details of this inspector's work, and so would the citizens of Newark. How much milk has he inspected in each month? how much has he condemned? why did he condemn it? and what was done with the milk thus condemned?

Allusion is made to "the intolerable sewerage nuisance that exists in the tenth and fourteenth wards," but no particulars are given and no particular action recommended.

We are told that the city has 15,000 privies and half as many cesspools, that the city provides no dumping grounds, but the only recommendation made is that "the city should provide proper dumping grounds to be used under the direction of the Board; no scavenger should receive a license unless he agrees to use the same, and their entire direction should be left to the management of the Board of Health."

It seems to us probable that it will be necessary to do a good deal more than this before Newark will have put herself in proper sanitary condition, so far as regards the disposal of her excreta.

We are told that there were during the year 3,921 deaths, but no attempt is made to calculate the annual death rate, or to present the statistics in any such a way as to be interesting or instructive.

No information whatever is given as to the expenditures of the Board, or the amount which the city pays for sanitary work. The report closes with the suggestion that more power should be given to the Board, but we are not told what kind of power is desired.

If Dr. Mandeville would now prepare a supplementary report which should contain full information upon the various points above suggested, we feel sure that it would be an interesting document, not only to the citizens of Newark, but to sanitarians everywhere.

BOOKS RECEIVED.

FIFTH ANNUAL REPORT OF THE CONNECTICUT STATE BOARD OF HEALTH, for the year ending November 30, 1882, With Registration Report of 1881.

EXCERPT MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS' SESSION, 1882–1883.—Track laying in 1882 on the Main Line of the Canadian Pacific Railway. By Henry Purdon Bell, M. Inst. C E.; The Sinking of Two Shafts at Marsden, for the Whithun Coal Company. By John Daglish, M. Inst. C. E.; Recent Hydraulic Experiments. By Major Allan Cunningham, R.E.; American Practice in Warming Buildings by Steam. By Robert Briggs, M. Inst. C. E.; Current Meter Observations on the Thames. By Professor William Cawnworth Unwin, M. Inst. C. E.

RHODE ISLAND, TWENTY-NINTH REGISTRATION REPORT, 1881.

FIRST ANNUAL REPORT OF THE BOARD OF HEALTH OF KANSAS CITY, for the calendar year, 1882.

IN MEMORY OF WILLIAM BARTON ROGERS, LL.D., late President of the Society of Arts of the Massachusetts Institute of Technology.

DIPHTHERIA AND SCHOOLS.

Under the date of Jan. 23, 1883, is printed a report made by Dr. Hubert Airy to the Local Government Board of England, upon an outbreak of diphtheria at Coggeshall, Essex, which occurred in the latter part of the year 1882. With two or three exceptions only, all of the infected families belonged to those which sent children to the church schools, no cases occurring in connection with the private schools. As soon as this fact became evident, the Health Officer, Dr. Abbott, urged that the schools should be closed, and they were closed on November 3. The number of new families attacked fell in the following week to three, and these were all attacked within four days after the church schools were closed, and were all families sending children to those schools.

"The church schools, having been closed 17 days, were re-opened on November 20 by the school managers, without consulting the sanitary authority. Since then there have been several fresh cases, two of them fatal; and the infection has spread to families of children attending the chapel school. On the representation of the Medical Officer of Health, the sanitary authority have (December 12) obtained the temporary closure of both church and chapel schools.

"At an early period in the epidemic, when it appeared that the spread of the disease was in some way dependent upon attendance at the church schools, suspicion fell upon the water of a pump in the boys' play-yard, to which all the children had access in one way or another. We have the means of testing, to some extent, the theory of the diphtheria being caused by the water, in the circumstance that one section of the school children, who stayed at the school for the dinner hour, had more opportunity than the rest of drinking the pump-water. If this water were the vehicle of the diphtheria contagium, we should expect to find a greater incidence of the disease among these children. But, in fact, the incidence of diphtheria was, if anything, rather less among these children than among those who went home to dinner. In the former group, comprising about 70 boys and girls, there were four or five cases of diphtheria—six or seven per cent. In the latter group, containing 353, there were about 30 cases, or eight per cent. The inference to be drawn from these data is that greater consumption of the pump-water did not cause greater incidence of diphtheria; and probably, therefore, this water was not concerned in causing or spreading the disease.

"There was no indication that the diphtheria was spread by milk, nor was there any reason to think that it was caused by air escaping from defective drains. At the schools there was no perceptible drain-nuisance, and the homes of the children attacked were scattered about the village and neighborhood, and were for the most part quite independent of one another as regards drainage."

The Royal College of Physicians of London is considering the propriety of instituting examinations and granting special certificates or diplomas in the subject of Hygiene.

The *Lancet* commends the proposal saying, "If the question referred to a special examination being instituted in midwifery, opthalmology, gynæcology, dermatology, or the like, we should unhesitatingly declare against it, since these are based on the study of anatomy, physiology, and pathology, in the same way as is general clinical medicine. But with hygiene special scientific subjects have to be studied. A medical officer of health should have a thorough knowledge of geology, of physics, mechanics, hydrostatics, and pneumatics. He must be a good analytical chemist, and it is absolutely requisite that he possess a practical knowledge of architecture—at all events, of all essential points connected with the building of dwelling-houses; and he should be skilled in all matters concerning bricklayers' and plumbers' work, in order to direct operations or to expose scamping. Now, however important it is for every medical man to give advice and to have a tolerably distinct idea with regard to questions of sanitary science, it is only a few who desire to make the study of it a special pursuit, who will have mastered all these technical details, and it is only fair that the man who has the special knowledge should have the opportunity of showing he possesses it. If only a general average is required with regard to hygiene from all candidates possessing a medical degree without reference being made to any special qualification, how are local boards to distinguish between candidates possessing the technical knowledge required from a medical officer of health and candidates who do not possess it."

The move is a good one and indicates the drift of public opinion. The public needs competent trained health officers, and it needs some means of knowing who they are. The action of the College if favorable to the proposition will be of decided benefit to the course of sanitation.

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Construction Notes.

PRINCETON, N. J.—Proposals for New Jersey Water Works, Feb. 27, 1883. Well 25 feet diameter, 18 feet through saturated gravel. Brick work to be 24 feet high and floored over partly with iron beams and brick arches, and partly wtih pine flooring.

Brick engine house, circular, on well, single story, conical roof, frame boiler house, chimney 40 feet high, stone foundation for tower 100 feet, on hill 6,000 feet from well.

Condon & Rehill	$5,700.00
J. T. Rowland	6,184.00
E. H. Fairchild	7,355.00
D. H. Valentine	8,388.00
J. J. Newman	9,400.00

Awarded to Condon & Rehill, Jersey City.

Pipe laying, 9,560 feet ten-inch; 2,850 feet six-inch; 5,620 feet four-inch; ten fire hydrants, setting stop cocks, etc.

Adams & Foster	$6,649.00
J. J. Newman	6,921.60
J. J. Cogan	7,374.45
Henry Lewis	7,464 40
D. H. Valentine	7,535.80
Everson & Crane	7,559.10
E. H. Fairchild	8,207.35
S. Trumbore	8,740.10
J. T. Rowland	9,107.80
Condon & Rehill	11,045.90

Awarded to Adams & Foster, Pottsville, Pa.

CHICAGO.—At the West Side Pumping Station preparations are being made to put in two new engines, each with a capacity of 15,000,000 gallons, which will increase the capacity of the works from 30,000,000 gallons to 60,000,000 daily, and the capacity of all the pumps of the city to about 130,000,000 gallons. Mr. Creigler has gone to New York to make the purchase of these new engines, and he will have them in place and working by next fall.

BROOKLYN.—Proposals for the construction of new school houses were opened at the meeting of the Board of Education on the 13th inst. Contracts will be awarded as follows, to the lowest bidders:

Colored School No. 1. For carpenter's work: Francis G. Turner, $8,235. For mason work, John D. Anderson, $11,473. For plumbing work, E. A. Miller & Co., $750.

Public School No. 21. For carpenter's work, Martin & Lee, $11.559 For mason work, James Ashfield & Son, $15,697. For plumbing work, E. A. Miller & Co., $947.43.

Public School No. 26. For carpenter's work, Martin & Lee, $11,634. For mason work, James Ashfield & Son, $16,597. For plumbing work, E. A. Miller & Co., $977 43.

Public School No. 40. For carpenter's work, Martin & Lee, $12,472. For mason work, F. J. Kelly, $18,197. For plumbing work, Brian & Jennings, $1,105.

Wings of Public School No. 30. For carpenter's work, (including plumbing), Francis D. Morris, $6,875. For mason work, P. Carlan & Son, $6,100.

GOVERNMENT BUILDINGS.

Court house and post office, Topeka, Kansas. Synopsis of bids for iron stairs received under advertisement of Feb. 23, 1883 and opened Mar. 14, 1883.

Hugh Ketcham & Co.	$7,898 75
McHose & Son	10,750 00
Snead & Co.'s Iron Works	6,200 00

The contract for erecting the marine hospital buildings at Memphis, Tenn., has been awarded to John Reid, of that city, for $38,775.

PHILADELPHIA GAS TRUST CONTRACTS.

The following bids have been received for gas pipe, the specification calling for 1,280 lengths of 30-inch and 750 lengths of 16-inch cast iron pipes and connections, the lengths to be 12 feet:

Union Hydraulic Company, Philadelphia—Connections 2⅞ cents per lb.

Burlington Stone and Heater Co., Burlington, N. J.—Per foot, 30-inch, $5.25; 16-inch, $1.89; connections, 2 6-10 cents per lb.

R. D. Wood & Co., Philadelphia—Per foot, 30-inch, $5.26; 16-inch, $1.83; connections, 3 cents per lb.

Warren Foundry and Machinery Co., New York—Per foot, 30-inch, $5.62; 16-inch, $2; connections, 3⅛ cents per lb.

A. H. McNeal, Burlington, N. J.—Per foot, 30-inch, $5.24; 16-inch, $1.90; connections, 3⅛ cents per lb.

Mellert Foundry and Machine Co., Reading, Pa.—Per foot, 30-inch, $5.37; 16-inch, $1.83; connections, 3 cents per lb.

Gloucester Iron Works, Gloucester, N. J—Per foot, 30-inch, $4.97; 16-inch, $1.77; connections, 2½ cents per lb.

The contract for the several classes has been awarded to the Gloucester Iron Works.

WHITE PLAINS, N. J.—The people are considering the building of water works and introduction of sewerage.

BROOKLYN.—Proposals will shortly be invited for laying the water main through the Eartern District from the Ridgewood reservoir to First streeet. The cost of the new line will exceed $250,000.

NEW YORK CITY.—The lowest bid for about 2,000 feet of lattice rail to be placed along the sides of the promenade and roadways of the East River bridge was made by Manley & Cooper, at 49 cents per lineal foot.

EXTENSION OF BROOKLYN WATER WORKS.

Surveys have just been completed for a proposed extension of the Brooklyn Water Works from Rockville Centre, its present terminus, to South Ogden Bay, a distance of about ten miles. The line takes in several streams and ponds and is expected to increase the daily supply by at least 20,000,000 gallons. The estimated cost is $2,500,000. The preparation of plans is intended to be completed in time to petition the next legislature for the necessary authority.

Inspector Terry, of Boston, seized 23 carcasses of "bob veal" at the Boston & Maine Railroad station the other day.

A citizen of Wilmington, Del., is greatly disturbed in his mind about the City Council's having called on Mr. Hering for a report on the best plan of sewering the city. His two principal causes of complaint are that Mr. Hering lives in New York and does not approve of leaching cesspools. The non-resident argument against any man or system, is a very powerful one to certain minds. General Sisera used it a good many centuries ago against the River Jordan. The advantages of cesspools in porous soil, sunk to the level of the ground water, are obvious to those to whom filth out of sight is also out of mind, whether at Wilmington or Trenton. But, fortunately, the world moves, though some of its occupants stand still.

The Hartford, Conn., Water Commissioners Report for March 1, 1883, shows an increase of receipts and decrease of expenditures as compared with the previous year. The receipts were $84,418.88 in excess of all expenses of maintenance, repairs and extensions of the works. They were thus enabled to pay the interest on the water debt, to pay off $25,000 of the principal, and have a surplus of $1,958.38. The receipts from water rents of 1882 amounted to $132,255.44 from 5,168 consumers. The cost of operation and maintenance of the works was $20,020.10, or about $3.90 per consumer, for which the city collected $25.60 from each consumer. The interest on the water bonds amounted to $57,460.50, or $11.12 per consumer. Every piece of property on which city water is used in Hartford, paid, therefore, $15.02 for expenses of maintenance and interest, and $10.58 additional for the benefits to the property on which no water was used. It is worth considering whether it would not be fairer to all parters to make all improved property pay its proper proportion of the expenses of the works.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stores *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Beaver st, No. 9, n w cor New st, brick restaurant and office build; cost, $110,000; lessee, Wm. Tumbridge; a, A. Hatfield; b, not selected.... West st, Nos. 24, 25, 26 and 27, n e cor Morris st, brick and terra cotta factory; cost, $85,000; o, Mrs. Hannah G. Gerry; a, Renwick, Aspinwall & Russell; b, Thos. Stone.... Vessey st, Nos. 57½-61, br ten: cost, not estimated; o, Edward M. Carey; trustee H. Carey's estate; a, Hugo Kafka; b, not selected.... Bleecker st, s e cor West 10th st, br ten; cost, $10,000; o, Henry A. Feste; a, Julius Kastner.... Stuyvesant st, No. 17, br ten; cost, $12,000; o, P. Henry Dugro; a, W. Klemt.... Cherry st, No. 359, s s, 91 e Montgomery st, br ten; cost, $7,500; o, Dennis Sullivan; a, Babcock & McAvoy; b, Giblin & Lyons... Monroe st, Nos. 57-61, 2 br ten; cost, each, $14,000; b, Hermann Schroeder; a, W. Jose.... Wooster st, No. 12, br store; cost, about $25,000; o, C. L. Wolfe; a, J. B. Snook.... Morton st, No. 22, br ten; cost, $8,500; o, Louis C. Raegener; a, F. W. Klemt.... 18th st, No. 8, W, br and stone flat; cost, $121,000; o, Louis L. Todd; a, A. Hatfield; b, Hugh Getty.... 21st st ——, 125 w 10th av, 4 br ten; cost, $12,000 each; o, Clinton Sutphen; a, G. B. Pelham.... 38th st, No. 324 E, br stable; cost, $5,000; o and a, M. Tobin... 24th st, No. 329 E, br ten; cost, $18,000; o, Charles Watkins.... 54th st, n s, 266 w 8th av, Conn. two brown stone ten; cost, each, $20,000; o, Peter Farley; a, Thom & Wilson.... Madison av, n w cor 76th st, 5 brown stone dwel; cost, each, $25,000; o, John Sullivan; a, J. E. Ware.... 1st av, s e cor 63d st, br flat; cost, $16,000; o, Thos. Hall; a, J. H. Valentine; b, James O'Hare.... 1st av, e s, 25.5 s 63d st, 3 br flats; cost, each, $15,000; o, a and b, same as last. .4th av, w s, abt 50 n 87th st, brown stone dwel; cost, $9,000; o, George W. Gray; a, John McIntyre; b, not selected.... 87thst, s s, 100 w, 2d av, 4 br and brown stone ten; cost, each, $18,500: o, Ph. Braender; a, Jno. Brandt.... 104th st, n s, 130 w 4th av, 2 brown stone dwel; cost, each, $6,000; o, James D. McGown; a, Andrew Spence.... 2d av, No. 2288, e s. 75.11 n 117th st, br and brown stone ten; cost, $20,000; o, Thomas Dunn; a, A. Arctander.... 116th st, s s, 80 e 3d av, brown stone store and ten; cost, $18,000; o, Enoch C. Bell; a, G. Robinson, Jr.... 7th av, s w cor 122d st, br ten; cost, $200,000; o, E. H. M. Just; a, M. C. Merritt.... 10th av, n w cor 146th st, 6 fr dwel; cost, each, $2,000; o, William Thompson; a, T. M. Clark; b, W. H. Berrian... St. Nioholas av, s e cor 127th st, 6 br flats; cost, each, $14,000 o, John G. Heintze; a, James Barrett.

ALTERATIONS, NEW YORK CITY.

Courtland av, n w cor 149th st, add one story; cost, $2,500; o, Hugh Martin.... Burling slip, Nos. 28 and 30, interior alterations; cost, $3,000; o, Thomas and Samuel C. White; b; T. Bradford.... 130th st, No. 18 E, one-story brick extension; cost, $8,000; o, John W. Aitken; a, W. B. Tuthill; b, J. B. Smith & Prodgers.... Water st, n e cor Maiden lane, br exten; cost, $7,000; o, Arend Schierenbeck; a, W. Jose.... Av A, No. 355; n w cor 22d st, br exten; cost, $6,000; o, John B. Slawson; a, A. Hatfield; b, not selected.... Broadway, s w cor Bleecker st, to Mercer st, repaired; cost, $5,000; o, Samuel Glover..... 87 Washington Pl, br exten; cost $6,000; o, Henry Thole; a, J. Sexton ...52 Maiden Lane, alter'ns; cost $7,500 (?); o, Louis and M. S. Herzog; a, B. F. Schweitzer; b, J. Van Dolsen and Henry Christie ....866 Sixth av, cor 49th br exten; cost day's work; o, Michael Weckerle; a, M. F. Conlan; b, J. A. O'Connor & Co.... 52 W 25th st, exten; cost $3,000; o, Michael Tierney; a, J. C. Burne; b, S. Bannen and H. McGilvery.... 78 and 80 Broad st, addn and alter'n; cost $25,000: o, Sarah C. Popham; a, S, D. Hatch.... 65 Park st, br exten; cost $2,500; o, Jas. Sylvester; a, J. H. Giles; b not selected.... 28 Waverly Pl, br exten; cost $15,000; o, J. Van Schaick; a, Hamilton & Pistor ...243 W 4th st, interior alter'n; cost $2,500; o, Chas. Schiemer; a, Cleverdon & Putzel; b, Th. Shipman.... 28 Ann st, addn and alter'n; cost $5,000; o, Jas. G. Bennett; a, McKim, Mead & White. 56th st n s, 220 w First av, add'n; cost $5,000; o, Walter Shriver; a, A. B. Ogden.... Seventh av, n w cor 41st st, br exten; cost $6,000; o, A. J. Ripley; a, Thom & Wilson; b, B. Sheridan and T. J. Duffy... 602 Eleventh av, alter'n; cost $3,600; o, John Rollmann; a, C. F. Ridder, Jr; b not selected ..823, 825 and 827 Sixth av, alter'n; cost $2,500; o, Louis Bressler; a, J. P. Decker.... 56 and 58 Bowery, s w cor Canal st br exten; cost $40,000; o, Citizens' Savings Bank; a, Fred C. Withers; b, Richard Deeves.... 67 Monroe st, br exten; cost $3,500; o, John Musgrave; a, Saltzer & Sherwood.

BROOKLYN.

Madison st, Nos. 259, 261 and 261½, n s, 300 w Marcy av, 3 brown stone dwell; cost, each, $6,000; o and b, Joseph I. Kirby; a, A. Hill ....Marcy av, w s, 20 n Stockton st, 2 fr dwel; cost, each, $3,000; o, Walter Davies; a and b, S. Peden, Jr ...Shaffer st, 100 feet from s e cor Bushwick av, 9 fr dwel; cost, each, $1,300; o, a and c, J. Hopkins, Jr; m, W. Wisler.... Quincy st, n s, 225 e Marcy av, 7 br dwel; cost, each, $5,000; o, F. B. Purdy; a, Thos. Wellwood; b, P Sullivan and F. Weeks.... Dean st, Nos. 1010, 1012 and 1014, s s, near Bedford av, 2 brown stone dwel; cost, each, $10,500; a and b, J. H. Townsend.... Elm st, n s, 114.3 w Bushwick av, 3 fr dwel; cost, ea, $3,000; o and b, F. Herr; a, W. Clemett.... Adam st, s e s, 200 n e Broadway, 3 fr ten; cost, each, $4,000; o. Henry Huthes; b, L. Hess... Manhattan av, e s, 131 s Greenpoint av, br store and ten; cost, $10,000; o, Martin Vogel; J. Kuntz & Co; a, F. Weber.... Manhattan av, e s, 35 s Greenpoint av, 4 br stores and ten; cost, each, $11,000; o and a, same as last.

BROOKLYN ALTERATIONS.

Sixth av, s w cor 20th st, repair seven bldgs; cost $4,000; o, Ryer Estate, G. L. Kelly, trustee; a. J. T. Miller; b, J. O'Connor and J. T. Miller.... 220 Columbia Heights, add'n and br exten; cost $10,000; o, Henry K. Sheldon; a, Parfitt Bros.; b, Jas. Stevenson and Hartt & Boyd.

ATLANTICVILLE, N. J.—Cottage; cost $2,000; o, J. Gould; a, A. L. Hartwell.

BAY HEAD, N. J.—F. cottage; cost $2,500; o, J. F. Ackerman; a, A. L. Hartwell.

BRIDGEPORT, CONN.—Knowlton st, br factory with addition; c, $50,000; o, Frank Amstrong; b, J. B. Curtis.

BALTIMORE, MD.—Dover st, s s, 1 br shop; o. Henry Hiese & Co..... Prat st, s s, 1 br bldg; o, D. C. Morgan & Co.... Cole st; s s, 10 br bldg; o, S. O. McComas; b, same.... Durham st, e s, 3 br bldg; o, Geo. C. Miller; b, same.... Warren st, s e cor Henry st, 1 br bldg; o, Thomas M. Hugh; b, same.... Madison ave, e s, 7 br bldg; o, Jos. Turner; b, same.... Anue st, e s, bt Bank & Gaugh; 1 br bldg; o, D. Eichengree; b, same.... Gough st, s s, 1 br bldg; o, Geo. C. Hershman; b, same.... Asquith st, s e cor Hoffman, 1 br bldg; o, John Disney; b, same.... Columbia ave, 3 br bldg; o, Chas. Duncan; b, same.... Woyer st, n s, 11 br bldg; o, Geo. C. Hershman; b, same.. Chester st, e s, 8 br bldg; o, same; b, same.

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BOSTON, MASS.—Evans st, nr Stanton av, fr dwell; o, Walter E. Wyman ...Berkley Pl, nr Dudley st, fr dwell; o, W. T. Hersey.... Storey Pl, fr dwell; o, Jas. Lee, Jr.; b, Holmes Bros....Rutherford av, cor Mill st, fr stable; o, David Sterns....118 Dore st, fr dwell; o, Mary A. D. Lewis....7 and 8 Washington st, two fr dwells; o, same as last ..Lamartine st, cor Ramond st, fr dwell; o, Michael Doyle; b, Jas. Potter....Park st, nr Pelton, fr dwell; o, Rebecca Todd; b, Geo. A. Spear....Parson st, cor Washington, fr dwell; o and b, Frelon Morris....Mant st, nr Granite av, fr stable; o, Patrick Grady; b, Jas. McLeon ...180 Dudley st, fr stable; o, Henry J. Seiler ...692 E 5th st, fr dwell; o, Jos. McMahone; b, Wm. Clymm..Marion av, bet Maynard Pl and Chickering Pl, br dwell and store; o, Geo. W. Flynn; b, J. W. Coburn & Co ...15 Bennet st, br charitable bldg; o, Boston Dispensary; b, McKenzie & Campbell....Pleasant st, cor South, br exhausting house; o, Boston Gas Light Co.; b, Thos. F. Rowland.. . Pleasant st, nr South, br purifying house; o and b, same as last ....Pleasant st opp South, br retort house; o and b, same as last.. Pleasant st, opp Washington, br meter house; o and b, same as last....25 South st, br mercantile; o. W. Rice; b, L. P. Soule.... 48 and 50 Village st, br veterinary institute: o, Henry A. Rice... 78 Rutland Sq., br dwell; o and b, W. S. Rand.

CINCINNATI, O.—Reave nr Elm, br, cost $12,000; o, J. F. Hall; b, H. E. Haltzinger....James nr 2d st, br, cost $6,000; o, Henry Rostert; b, H. Lehmann . 180 McLean av, br, cost $6,000; o, Henry Nagel; b, Henry Nagel ...449. and 451 w 9th st, br, cost $6.000; o, Thos. Gibson; b, Thos. Gibson....Spring nr W Millan sts, br, cost $6,000; o, A. S. Longley; b, Henry Harris.

CHICAGO, ILL.—Cor Ashland av and Adams st, st church; cost $40,000, o, Episcopal Parish of the Epithany; a, not decided; b, not decided....Cor Washington boul and Robey, br veneering on church; cost $7,000; o, St. Andrews Episcopal Parish; a, Albert Smith; b, not decided .. 99-101 Washington st, 2 add stories st to office b'd'g; cost $10,000, o, the Sears Estate; a, W. L. B. Jenney; b, not decided....Washington boul nr Robey st, rock faced flats; cost $10,000; o, Mr. Grasse; a, Albert Smith; b, not decided.... Leavitt nr Van Buren, br flats; cost $6,000; o, Thos. Sutton; a, Albert Smith....Pine st cor Ohio, pressed br and st dwel; cost $30,000; o, W. M. Hoyt; a, Albert Smith; b, not decided .. Cor Wabash av (n w) and Congress st, st store, 6 stories and Mansard, cost $100,000; o, J. O. Adams; a, Treat & Tolty; b, C. and A. Price .. 837-341 S. Oakley av, br flats, cost $9,500; o, A Williams; a and b, owner; 622 Weldo st, br flats; $6,500; o, H. Eisert; a, none; b, M. Bender....689 Milwaukee av, st and flats, cost $7,000; o, Foninski & Mikctynski; a, W. Clifford; b, J. Fishk 379 Taylor st, br st and dwel; cost $5,600; o, G. Fiitz; a, G. Beasler; b, Geo. Wack....2635 Calumel av, br st and flats; cost $6,000; o, M. Wheeler; a, Walker & Co.; b, M. Wheeler....212 Oak st, br dwel; cost $7,000; o, J. B. Lynch; a, Lynch & Masters; b, owner....170 Schiller st, br dwel; cost $5,000; o, Carl F. Julin; a, none....38 W. Madison st, br add to st; cost $6,000; o, Dennis Ryan and M. Cullen; a, none; b, owner....751 N. Wells st, br dwel; cost $6,000; o, E. B. Shelden; a, Burling & Whitehouse; b, L. Weick....331 Centre av, br dwel; cost $6,000; o, Louis Weick; a, none; b, owner ...165-175 Bissell st, 6 br dwel; cost $15,000; o, Aug. Leiber; a, Geo. Spohr; b, Aug. Niemann....70 Lincoln av, br dwel; cost $8,000; o, Christian Pfeiffer; a, owner..103-105 Centre av, br flats; cost $8,000; o, A. Stafford; b, Lehman & Sons ....13-15 Park av, br dwel; cost $7,000; o, J J. Shutterley; a, S. V. Shipman....542-544 Wabash av, br add story; cost $5,000; o, W. P. Loberg & Co.; b, owners .. 641 W Chicago av, br dwel; cost $5,000; o, A. Schnacke; b, owner....233 N Wells, br livery stable; cost $5,000; o, Gus Quitman.

DETROIT, MICH.—Fourth ave, 2 fr dwel; c, $5,000; o, A. E. French ... Woodward ave, 411 to 415, br bl stores; c, $20,000; o, E. R. Brooks 316 & 318 w Fort st, 2 br st & dwel; c, $11,000; o, W. C. Laner....Fourth st, & Gratiot ave, br st & dwel: c, $8,000; o. Ernest Knapp....Jefferson ave, rebuilding bl st; c, $12,000; o, Collins & Jaynes....Michigan & Lafayette ave, bank bl; c, $18,000 o, Fisher estate; a, G. W. Lloyd; b, A. Chapoton....93 & 95 e Montcalm st double br dwel; c, $6,000; a, A. C. Varney....169 e Columbia st, double br dwel; c, $7,000; a, A. C. Varney....106 w Congress st, br factory; c, $21,000; a, A. C. Varney....East Willis ave, br dwel; c. $7,000; a, A. C. Varney ...West Willis ave, br dwel; c, $6,800; a, A. C. Varney.

HYDE PARK, ILL.—Br school house; cost $23,000; o, vil'age; a, Mclean; b, not decided.

HAMMONTON, N. J.—Store and dwel; cost $10,000; o, A. N. Cochrun; a, A. L. Hartwell.

LONG BRANCH, N. J.—Fr cottage; cost $4,000; o, Wm. N. Silkworth; a, A. L. Hartwell ...Fr cottage; cost $3,000; o, A. L. Bampton; a, A. L. Hartwell....Hotel; cost $7,000; o, S. Vandyke; a, A. L. Hartwell.

MONMOUTH BEACH, N. J.—Cottage; cost $10,000; o, Oliver Doud Byron; a, A. L. Hartwell....Fr stable; cost $3,000; o, Oliver Doud Byron; a, A. L. Hartwell.

MILWAUKEE, WIS.—Cor 4th st and Reservoir av, hospital (brick) for Sisters of St. Francis; cost $30,000.. 23d st, bet Grand ave and Wells st, three dwel; cost $6,500; o, Garrett Dunck ...Ogden st, bet Milwaukee and Jefferson st, br add to build; cost $16,000; o, Convent of Notre Dame; a, H. C. Koch & Co....cor Wells and 24th sts, fr dwel; cost $5,000; o, Wm. H. Stevens; a, E. T. Mix & Co....E. Water st, br store; cost $5,500; o, C. F. Mueller; a, H. Messmer....Clybourne st, nr West Water, br build; cost $23,000; o, John Johnston; a, E. T. Mix & Co.; m, Hiram R. Bond; c, John Langenberger; tenants, Kieckhefer Bros. ..Milwaukee st, bet Michigan and Wisconsin sts, four-story br hotel, 90 x 112; cost $50,000; o, Mrs. Jane Follansbee; a, E. T. Mix & Co....North West cor Milwaukee and Mason sts, br block of stores and offices; cost $100,000; o, Wis. Cent. R. R. Co....a, E. Townsend Mix & Co ...west side of Marshall st, nr Martin, br dwel; cost $7,000; o, James Suydam of the Goodyear Rubber Co.; a, James Douglas....Cor Grand av and 22d st, br dwel; cost $7,500; o, Aug. Weigell; a, H. C. Koch & Co ..24th st, bet Wells and Cedar sts, fr cottage; cost $5,000; o, H. Schroeder; a, Carl F. Ringer....Grand av, nr 11th st, br dwel; cost $6,000; o, Dr. F. W. French; a, James Douglas....National av, nr city limits, club house; cost $10,000; o, Hughes & Brandt; a, James Douglas....Wells st, nr 30th st, fr dwel; cost $5,500; o, G. L. Gillette; a, James Douglas... Grove st, br store; cost $5,000; o, Mr. Lamers; a, A. Elleson....89 and 91 Wisconsin st, br add to store; cost $5,000; o, E. H. Brodhead and T. L. Kelly & Co.; c; Adam Kloes....West Water st, bet Wells and Grand av, br block; cost $12,000, 40 x 110. o, F. W. Hartmann; a, H. C Koch & Co. ....Astor st, nr cor of Pleasant, br dwel; cost $5,000; o, Fred Heintz.

NEW HAVEN, CONN.—State st, cor of Frank st, br store; cost $5,000; o, E. A. Chatfield....Wall st, br dwel; cost $6,000; o, Duxter Alden....Well st, br block; cost 12,000; b, E. Sperry.

PHILADELPHIA, PA.—Pepper w. of Cedar st, 4 dwel; b, John S. Kaldt & Sons....624 Lombard st, br dwel; o, E. Shay .4032 Lancaster av, 3 dwel and store; b, W. Martin...Somerset north of Huntingdon sts; 7 dwels and store; b, Geo. Kessler ...Clearfield above Alomed sts, 7 dwel; b, J. R. Pyle ...Tioga e. of 21st st 2 dwel; o, F. W. Hammett ...Tioga cor of 21st st, 2 stores and dwel; b, L. J. Jeffries....Chestnut e. of 38th st. dwel; o, E. W. Budd....Mt. Pleasant 8 dwel; b, Geo. Kessler.. .Frankford Road of Huntingdon st, 3 dwel; b, John Cunningham... Snydes av e. of 2nd, Ice Packing house and Boiler House; o, J. T. Alburger.. 1335 Elsworth st, dwel; o, Chas. O'Neil....Reese n. of York st, 12 dwel; b, A. J. Richards.....Bell s. of Baring st, 2 dwel; b. T. C. Sloan....Leiper n. of Arratt st, dwel; b, W. Kneas....Christian w. of Broad st, 3 dwel; o, John Laughlin ....Christian e. of 15th st, 4 dwel: o, Robert Russell....Carrvern w. of Dickerson st, 11 dwel; o, Thomas Grinnan.

ST. LOUIS.—St. Louis ave bet 1st and Commercial st; fr saw mill; cost $8,000; o, Schulenburg & Boeckler Lumber Co....Delmar, bet Grand and Vandeventer aves, 2 br dwels; cost $4,500, e,; o, N. F. Zitting; a, Beinke; c, P. Tolk ...Hickory st bet St. Ange av and Morton st, br dwel; cost $8,000; o, J. Bloesser; a, Jansen; c, F. Offermann....18th st bet Cass ave and Mullanphy st, two br dwels; cost $2,800; o, F. Wemhner; c. C. Bleikamp...2nd Carondelet bet Lafayette and Shields aves, two br dwels; cost $7,500; o, E. Velker; c, Wm. Gall....Olive bet 21st and 22nd sts, four br dwels; cost $15,000; o, Robt. Dougherty; a, F. Weston; c, A. J. Cramer & Co....Olive st bet Ware and Grand aves, two br dwels; cost $9,980; o, Britton A. Hill; a, Barnett; c, Stephen Russell.... 2nd st bet Wash st and Franklin av, br store; cost $15,000; o, Beck & Corbit Iron C.; c, sub-let....Withers bet Benedict av and Railroad, factory; o, A. B. Mayer; c, Charles Mayer....Clark bet Compton and Montrose avs, dwel; cost $7,000; o, W. Johnston; c, W. J...13th bet Monroe and Exchange sts, tenement; cost $5,000; o, J. Camien; a, Schaper; c, J. Schuster....St Louis av bet 18th and 19th sts, br dwel; cost $6.000; o, Wm. Steinlreder; c, H. C. Brinkmeyer....Locust st bet Compton and Leonard avs, two adjacent dwels; cost $11,000; o, A. C. Betts; a, F. Weston; c, S. H. Hoffman ...Dickson st bet Garrison and Webster avs, four adjacent dwels; cost $14,000; o, E. J. Senseney; a, J. B. Legg; c, J. Strimple....Dillon st bet Chonteau ave and Lasalle st, dwel; o, Otto Oeters; a, Beinke; c, J. C. Nagel....Finney av bet Grand and Vandeventer avs, two adjacent br dwels; cost $9,000; o, J. F. Randall ...Delmar bet Grand and Vandeventer avs, dwel; cost 10,000; o, M. S. Forbes; a, J. B. Legg; c, A. E. Cook . Main bet Biddle and O'Fallon sts, factory; cost $15,000; o, G. B. Allen; c, Sam Robbins....2nd bet Biddle and Carr sts, factory; cost $7,000; o and c, same as last....5th bet Vine and Olive sts, building; cost $20,000; o, B. W. Alexander; a, Barnett; c, sub-let....Eliott av, Montgomery and Benton sts, two br dwels; cost $2,500, e; o, Ed. J. McCarty; a, Patrick McCarty....Easton av bet Garrison and Cardinal avs, three br dwels; cost $5,000; o, J. J. Smith; a, Shaper; c, sub-let....Chestnut st bet Cardinal and Compton avs, two br dwels; cost $5,000; o, W. E. Bent; c, W. E. B....West 16th st bet Cass av and Mullanphy st, br dwel; cost $5,000; o, Sebastian Klein; c, H. W. Rocklage....Lindell bet Cabanne and Vandeventer avs, br dwel; cost $10,000; o, Geo. T. Cram; c, J. H. Maurice....Lafayette av bet 2nd Carondelet av and Preston Place, dwel; cost $5,000; o, P. Hulm; a, C. F. May; c, C. Wehking....Olive bet 15th and 16th sts, picture gallery; cost 3,000; o, Toundorff & Kuhn; a. C. D. Boissilier; c, J. H. Frye....Mallinkrods bet 17th and 18th sts, two tenements; cost $6,000; o, G. Mertensmier; a, O. P. Koenig; c, W. Herkenhoff & Bro...Roushenbach av bet Dodier st and Sullivan av, dwel; cost $6,000; o, Wm. C. Schuetz; a, C. F. May; c, P. Richars....6th bet Biddle and O'Fallon sts, dwel; cost $10,000; o, Rev. James McCaffrey; a, J. H. McNamara; c, sub-let....8th bet Clark av and Walnut st, warehouse; cost $20,000; o, Aultmann, Miller & Co.; a, Mortimer; c, Helm Bros.....McNulty st bet 2nd Carondelet av and Veil Place, iron clad; cost $9,000; o, Peoples Railway Co.; c, Wm. Cochran.

WORCESTER, MASS.—Gold st, br machine shop; cost $8,000; o, F. E. Reed & Co.; a, S. C. Earle; b, S. W. Dearborn....Lincolnst, fr dwel; cost $6,400; o, W. T. Brown; a, S. C. Earle; b, O. M. Ball.

WASHINGTON, D. C.—Farragut sqr, br, cellar and mansard; cost $12,000; o, Nathan Sargest; b, J. C. Hornblower ...Farragut sqr, br, cellar and mansard; cost 9,000; o, Jas. M. Varnum ... 2d bet D and E sts, br with cellar; cost $6,000; o, Geo. Watts; b, J. Shane....Mt. Pleasant st, st and fr; cost $5,000; o, Ellie Spear; a, J. W. Wagner; b, J. Hall....20th st bet M and N, br with mansard and cellar; cost 5,000; o, Thos Kinney; a, Gray & Page; b, Thos. Kinney.

The aldermen of Yonkers wisely decided not to submit the engineering questions involved in the purification of the Nepperhan to popular vote. They have instead concluded to give the advocates of various methods of remedying the evil a public hearing, at which all amateur experts can speak their mind. In this connection it is not amiss to quote a saying of Henri Rochefort: "Anyone can be an expert if he can find someone else inexpert enough to take him at his word."

Dr. Harvey Jewett, of Canandaigua, in his recent address as President of the Medical Society of the State of New York, made some well-timed and sensible remarks upon the duties of medical men in relation to sanitary matters. After pointing out that much more is now demanded of the practicing physician than was the case twenty-five years ago, special attention was called to the inability of the majority of practicing physicians to properly advise their patients and patrons in sanitary matters, owing to their ignorance of the first principles of sanitary science.

The finger of investigation points to certain defects in drainage, water supply, or ventilation, as the prolific source of disease. How many physicians are able to recognize these defects with certainty, or to give competent advice for their remedy? How many health officers, especially in the smaller settlements, are versed in the principles of natural philosophy which lie at the foundation of all drainage and ventilation? Surely, the work of inquiry into the etiology of disease demands that the investigator be equipped with more than a surface knowledge of chemistry, and be more than a novice in the use of the microscope. "I claim," he says, "that the physician, who is not only to minister to the sick, but in his noble work, to protect the health and lives of others, should possess as a foundation for the superstructure of his strictly medical education, an accurate and serviceable knowledge of the principles of chemistry, natural philosophy and the natural sciences generally."

"That many physicians graduate with this needed preparation, and thoroughly equipped in all respects, is a matter for congratulation. But those do not compose the rank and file of the profession in this country to-day. The demand is for more thoroughly educated medical men and women, and that demand must be met by men taken, not directly from the farm, the work shop, and the common school, but by those favored with the rigid mental discipline of academy or college, and well grounded in the principles of natural science. * * *

"So pressing does the need appear of more thoroughly educated and studious men to stand as guardians of the public safety in every village and hamlet of this vast country, that I cannot, in conclusion, but revert somewhat to the thought which found utterance at the opening of these remarks. We want men in every country district of the land, as well as in every city, who shall be worthy the name of professional gentlemen. Who, in general information and culture, though mingling largely or solely with the uneducated, shall be among them and not of them, and who, by reason of the power which knowledge and mental discipline gives, shall be leaders among the people in every good enterprise, and give a dignity to and a respect for the profession of medicine which, I regret, it does not fully possess to-day. Under the present system of medical education, I fail to see a prospect for the achievment of this desirable result. So long as men are permitted to graduate from some of our most reputable medical schools, to enter the ranks of the regular profession so poorly equipped for life service in a profession which demands the very best of talents and preparation, we cannot wonder that quackery continues to flourish and to receive the patronage, humiliating to confess, of some who are on other subjects the most enlightened.

"When the requirements for entrance upon the study of medicine in our medical schools are made vastly higher, when the teaching is better systematized and a longer time in preparation is insisted upon, not only will the profession rise higher in public estimation, but there will then be opportunity for the teaching of hygiene and some other departments, for example that of legal medicine, which now are, as a rule, sadly neglected.

"Thanks to earnest workers and great facilities for education, both at home and abroad, the profession of medicine in America, shows a very bright side, as well as a dark one, to which I have alluded. Scattered through the entire country are men at work who are shedding lustre upon their profession, and others to be numbered by the hundred, who in a quiet way are doing all that is possible to magnify their calling and to induce the respect of mankind.

"When such men take the places universally of those who, it is to be regretted, by no means adorn their profession, we shall hear fewer denunciations of doctors, which we know sometimes to be too well deserved, but which reflect none the less surely upon the profession as a whole, because incurred by some unworthy member who is yet in the ranks by the tolerance both of his professional brethren and the law of the State.

"No monomaniac will then be permitted, in the public prints, to flaunt his maledictions upon 'physic and physicians' as 'twin scourges of humanity,' because of the respect which the medical profession will everywhere command. Though less in numbers, because of the necessities of the case, when preventive medicine shall have attained its destined eminence, we shall hold a prouder position, and be more than ever the benefactors of the race."

The Asbury Park *Shore Press* becomes very indignant over a recent publication reflecting on the sewerage of that place, and states that the sewers were begun in 1879, have been gradually extended each year since and have worked satisfactorily. There are 12 miles of sewers in use.

"Only one portion of the whole system of sewerage has at any time caused annoyance to the public. During the summer of 1882 the original experimental wooden receiving vault, located on the sea shore, became leaky, and permitted its contents to flow out upon the sand. This caused rapid liberation of gases, and, until it could be repaired, it created an abominable nuisance in the neighborhood of the said vault. Another vault, constructed of brick and cement, which was built after the efficiency of the sewer system had been established, has given no trouble."

It is further stated that 3,400 feet of sewers are laid on a grade of ½ inch in 100 feet. This is a hardly appreciable fall, and is likely to cause trouble unless provision is made for frequent and copious flushing.

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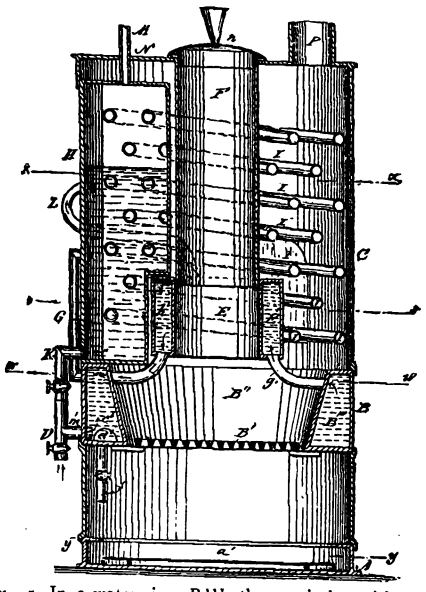
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

266,816. HEATER FOR DWELLING-HOUSES. James B. Harris, Jr., Geneseo, N. Y. Filed April 28, 1882. (No model.) Issued Oct. 31, 1882.



Claim.—1. In a water-ring, B[111], the vertical partition c^1, provided with opening d^1, substantially as herein shown and described, for the purpose of aiding in the circulation of the water within the heater.

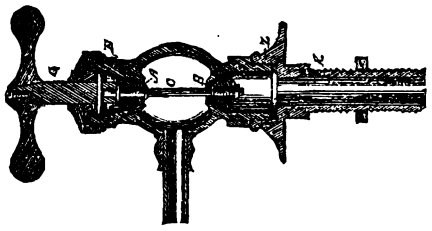
2. The water-base E, provided with vertical diphragms h^1 h^1, in combination with the pipes C g^1 l^1 L, substantially as and for the purpose described.

3. In a heater, the combination, with the fire-pot B[11], the pipes g^1 l^1 G, and the water-space E[1], of the drum H and the inclined circular pipes I, substantially as and for the purpose set forth.

4. In a heater, the combination, with the fire-pot B[11], the water-ring B[111], the pipes g^1 l^1 G, and the water-space E[1], of the drum H, the inclined circular pipes I, and the pipes K m^1, substantially as and for the purpose set forth.

5. In a heater, the combination, with the water-space E[1], surrounding the base E, and the drum H, of the curved pipe L, extending from the water-space E[1] radially through the heater, and thence curved inwardly into the drum H, substantially as and for the purpose set forth.

267,103. FAUCET. Edwin F. Pierce, Milwaukee, Wis. Filed Dec. 27, 1881. Renewed Sept. 23, 1882. (No model.) Issued Nov. 7, 1882.

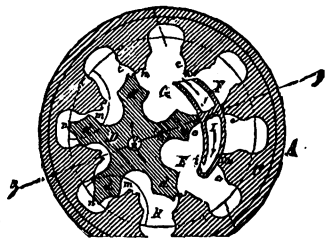


Claim.—1. In a single faucet, the combination and arrangement of two stoppers upon a single connecting-rod, one of said stoppers being located below the spout and adapted to close with the water, and the other located above the spout and adapted to be closed against the water and serve as a packing to prevent the escape of water around the faucet-stem when said lower stopper is opened, substantially as set forth.

2. In faucets, the device for communicating downward pressure to said valves, consisting in the combination of stem G, axle E, provided with anti-friction rollers F F, and stationary disk I, provided with cams D D, said stem G being formed in a separate piece from and adapted to bear upon said rod as it is revolved, substantially as set forth.

3. In faucets, the combination, within the barrel or body thereof, of stopper A, located above the spout, stopper B, located below the spout, connecting-rod C, stem G, handle H, disk I, cams D D, rollers F F, and axle E, all substantially as set forth.

267,174. ROTARY WATER-METER. Benaiah Fitts and James F. Wilson, Worcester, Mass. Filed June 5, 1882. (No model.) Issued Nov. 7, 1882.



Claim.—1. In a meter mechanism, a partition or bulk-head piece introduced between the eccentrically-arranged piston and the surrounding cylinder or ring-gear, for separating the intermediate space into receiving and delivering chambers, substantially as set forth.

2. The combination, in a meter, of an outer ring or cylinder having internally-arranged projections or cogs, an externally-toothed intermeshing piston mounted upon an axial support or journals eccentric to and revoluble about the main or central axis, and an intermediate barrier or partition adapted to move about the main axis in unison with the axial bearing of said piston, substantially as hereinbefore set forth.

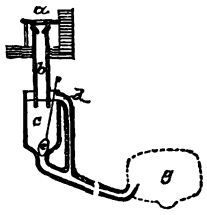
3. The combination, with the ring-gear and intermeshing piston-gear, of revoluble end plates concentrically journaled within the cylinder-heads, and adapted for supporting the partition or bulk-head piece and the piston-journal, substantially as set forth.

4. The partition or barrier-piece F, constructed with one or more conduits or passages, in combination with the cylinder-gear and revoluble piston, whereby said partition is adapted to serve as a mouth-piece for the entrance or exit of fluid to or from (either or both) the piston-chamber of the meter, substantially as hereinbefore set forth.

5. The combination, with the cylinder-gear, revoluble piston, and revoluble end plates having conduits or openings to the piston-chambers, of the heads A[1] A[2], provided with connecting-bosses *a* a^1, and having annular chambers W, whereby fluid can be taken and discharged irrespective of the varied positions of the internal revoluble parts, substantially as set forth.

6. The combination, with the intermeshing cylinder-gear and piston-gear, of heads or end plates having the recesses or channels *m*, as and for the purpose set forth.

267,190. WATER CLOSET. Stephen Goldner, Baden, Germany. Filed Aug. 24, 1882. (No model.) Patented in Germany June 26, 1881, in France July 16, 1881, in Belgium Oct. 14, 1881, in Great Britain Oct. 20, 1881, in Spain Nov. 9, 1881, in Italy Nov. 12, 1881, and in Austria-Hungary Jan. 15, 1882. Issued Nov. 7, 1882. Issued Nov. 7, 1882.

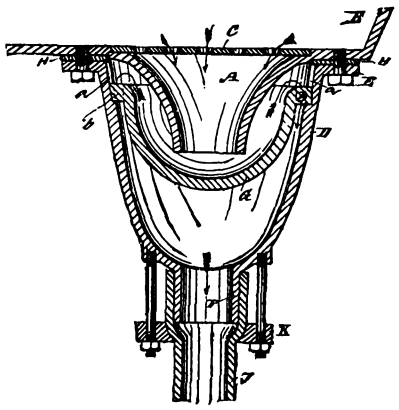


Claim.—1. The combination, with the receiver or reservoir provided with overflow and discharge pipes, the latter connected with said receiver at the bottom, of the soil pipe dipping into said receiver or reservoir a suitable distance, as indicated, below the mouth of said overflow pipe, substantially as described.

2. The combination of the receiver adapted to contain a volume of water, the soil pipe projecting below the level of the water therein to about the depth indicated, the overflow pipe at the top of said receiver, and the discharge pipe at the bottom thereof, normally closed by a valve or stopper, substantially as described.

3. The combination of the receiver, the soil pipe projecting therein-into, the discharge normally closed by a valve or stopper, and the overflow connected with the receiver at a point above the lower orifice of said soil pipe and emptying into the discharge pipe beyond said valve or stopper, substantially as described.

267,264. FUNNEL TRAP FOR SINKS. John G. Schill, Hoboken, N. J. Filed March 2, 1882. (No model.) Issued Nov. 7, 1882.



Claim.—The combination, with the sink B, of the funnel A, projecting from the bottom of the same, the funnel D, provided at its inner surface with recesses, *a*, and the cup G, held within the funnel D and provided with lugs *b*, substantially as herein shown and discribed, and for the purpose set forth.

266,580. ARTIFICIAL BUTTER AND METHOD OF MAKING THE SAME. William H. Burnet, Chicago, Ill. Filed June 30, 1882. (No specimens.) Issued Oct. 24, 1882.

266,613. HOT-AIR GENERATOR FOR FIRE-PLACES. Jesse S. Deardorff, Canal Dover, Ohio. Filed May 5, 1882. (No model.) Issued Oct. 31, 1882.

266,629. FAUCET ATTACHMENT OR CASK-STOPPER. William W. Jackson, Chicago, Ill., assignor of two-thirds to George H. Eaton and Cabel W. Webster, both of same place. Filed Aug. 11, 1882. (No model.) Issued Oct. 31, 1882.

266,631. COMBINED GAS AND OIL BURNER. James H. Kidder, Lawrence, Mass. Filed Aug. 31, 1882. (No model.) Issued Oct. 31, 1882.

266,634. GAS-BURNER. James G. Miller, Green Bay, Wis. Filed Mar. 24, 1882. (No model.) Issued Oct. 31, 1882.

266,639. REGRINDING VALVES. Jeremiah O'Meara, New York, N. Y. Filed June 6, 1882. (No model.) Issued Oct. 31, 1882.

266,676. GAS-BURNER. Sidney Cook and John H. Piper, Boston, Mass. Filed March 18, 1882. (No model.) Issued Oct. 31, 1882.

266,677. CONDUIT FOR ELECTRIC LINES. Robert H. Corbett, New York, N. Y. Filed Dec. 27, 1881. (No model.) Issued Oct. 31, 1882.

266,681. CONDUIT FOR ELECTRICAL CONDUCTORS. Geo. S. Eaton, Brooklyn, N. Y. Filed May 1, 1882. (No model.) Issued Oct. 31, 1882.

266,693. WATER-FILTERING DEVICE. Augustus H. Horsnell and William Murphy, Montreal, Quebec, Canada. Filed Jan. 16, 1882. (No model.) Issued Oct. 31, 1882.

266,793. ELECTRIC DISTRIBUTION SYSTEM. Thomas A. Edison, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Dec. 9, 1881. (No model.) Issued Oct. 31, 1882.

266,856. SAND-PUMP. Samuel McCaughtry, Bradford, Pa. Filed June 22, 1882. (No model.) Issued Oct. 31, 1882.

266,888. GAS BURNER. Elias B. Requa, Jersey City, N. J. Filed Sept. 19, 1882. (No model.) Issued Oct. 31, 1882.

266,889. GAS-BURNER. Elias B. Requa, Jersey City, N. J. Filed Sept. 19, 1882. (No model.) Issued Oct. 31, 1882.

266,890. GAS-BURNER. Elias B. Requa, Jersey City, N. J. Filed Sept. 19, 1882. (No model.) Issued Oct. 31, 1882.

266,894. FLEXIBLF SELF-GAGING FAUCET. William T. Robertson, Montgomery, Ala. Filed Sept. 9, 1882. (No model.) Issued Oct. 31, 1882.

266,916. UNDERGROUND ELECTRICAL CONDUIT. Samuel D. Strohm, Philadelphia, Pa., Filed Feb. 13, 1882. (No model.) Issued Oct. 31, 1882.

266,929. FILTERING PETROLEUM DISTILLATES FOR THE SEPARATION OF PARAFFINE. Henry Warden, Philadelphia, Pa., assignor to the Atlantic Refining Company, same place. Filed Sept. 22. 1882. No model.) Issued Oct. 31, 1882.

266,930. COOLING PETROLEUM DISTILLATES. Henry Warden, Philadelphia, Pa., assignor to the Atlantic Refining Company, same place. Filed Sept. 4, 1882. (No model.) Issued Oct. 31, 1882.

266,933. FIRE-PLACE. Charles A. Wellington, Lexington, and Albert Chase, Boston, Mass. Filed July 17, 1882. (No model.) Issued Oct. 31, 1882.

266,954. NON-ABSORBING AND HEAT-INSULATING MATERIAL. Robert J. Eberts and J. Lawrence Lee, New York, N. Y.; said Ebert assignor to the American Heating and Power-Company, same place. Filed Sept. 25, 1882. No model.) Issued Oct. 31, 1882.

266,969. CHANDELIER FOR ELECTRIC CANDLES. Charles A. Cheever, New York, and Willard L. Candee, Brooklyn, N. Y. Filed May 3, 1882. (No model.) Issued November 7, 1882.

266,971. ARTIFICIAL FUEL. Carol H. Coggeshall, St. Louis, Me. Filed March 8, 1882. (No specimens.) Issued November 7, 1882.

266,978. APPARATUS FOR FEEDING SHAVINGS TO STEAM-BOILER AND OTHER FURNACES. Lewis P. Conklin, Green Point, N. Y. Filed June 16, 1882. (No model.) Issued November 7, 1882.

266,979. RADIATOR. Thomas Davis, St. Paul, Minn. Filed May 29, 1882. (No model.) Issued November 7, 1882.

266,981. APPARATUS FOR BATH PURPOSES. Lowell M. Emery, Louisville, Ky. Filed June 30, 1882. (No model.) Issued November 7, 1882.

266,990. APPARATUS FOR SEPARATING PETROLEUM VAPORS. William C. Hall, Oil City, Pa., assignor of one-half to Benjamin F. Brundred, same place. Filed July 19, 1881. (No model.) Issued Nov. 7, 1882.

267,009. DEVICE FOR HEATING RAILROAD CARS. Wm. Martin, Tidioute, Pa. Filed May 12, 1882. (No model.) Issued Nov. 7, 1882.

267,029. MACHINE FOR WELDING PIPE, &c. Alexander A. Smyth, Sr., Titusville, Pa. Filed June 16, 1882. (No model.) Issued Nov. 7, 1882.

265,036. STEAM-GAGE COCK. Marquis De L. Swank, Jasper T. Thornley and John A. Awalt, Anderson, Ind. Filed July 25, 1881. (No model.) Issued Nov. 7, 1882.

267,044. PROCESS OF AND APPARATUS FOR INSULATING WIRES FOR ELECTRIC USES. Richard S. Waring, Pittsburgh, Pa., and J. Burrows Hyde, New York, N. Y. Filed July 17, 1882. (No model.) Issued Nov. 7, 1882.

267,045. INSULATING MATERIAL FOR ELECTRIC USES. Richard S. Waring, Pittsburg, Pa., and J. Burrows Hyde, New York, N. Y. Filed Aug. 17, 1882. (No specimens.) Issued Nov. 7, 1882.

267,046. INSULATING COMPOUND FOR ELECTRIC WIRES. Richard S. Waring, Pittsburg, Pa. Filed Sept. 5, 1881. (No specimens.) Issued Nov. 7, 1882.

267,102. VENTILATING APPARATUS. Emil H. C. Oehlmann, Berlin, Germany. Filed Mar. 27, 1882. (No model.) Patented in Germany Mar. 26, 1880, No. 12,520. Issued Nov. 7, 1882.

267,113. GAS-LAMP. Charles W. Siemens, Westminster, County of Middlesex, England. Filed May 2, 1882. (No model.) Patented in England Nov. 13, 1880, No. 4,683; in France Jan. 6 1881, No. 140,509; in Germany Jan. 7, 1881, No. 15,467, and in Belgium Jan. 8, 1881, No. 53,520. Issued Nov. 7, 1882.

267,114. APPARATUS FOR COOLING AIR. John P. L. Simon and Charles Abele, New York, N. Y. Filed Mar. 1, 1882. (No model.) Issued Nov. 7, 1882.

267,115. TOWER FOR ELECTRIC LIGHTS, &c. Charles D. F. Smith, Aurora, Ill. Filed July 29, 1882. (No model.) Issued Nov. 7, 1882.

267,123. GRATE BAR. Hawley Adams, New York, N. Y. Filed Sept. 9, 1882. (No model.) Issued Nov. 7, 1882.

267,128. HOT-AIR REGISTER. James S. Bailey, Brooklyn, N. Y. Filed May 16, 1882. (No model.) Issued Nov. 7. 1882.

267,129. GRATE. John C. Bard, Albany, assignor of one-half to John C. Hoffman, New York, N. Y. Filed Sept. 7, 1882. (No model.) Issued Nov. 7, 1882.

267,133. FILTERING-FUNNEL. Henry Bell, Baltimore, Md. Filed Mar. 14, 1882. (No model.) Issued Nov. 7, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MARCH 10th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of-	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
North Atlantic Cities.																							
Portland.....Maine	34,519	14	20.8	2	14.2			3					1			1							
Boston.....Mass	407,581	174	21.8	46	26.4	10		29	1	4	7	1	1		2	18		9		1	2		2
Cambridge.....Mass	57,432	23	20.8	9	39.1			6	1		1					2							
Worcester.....Mass	64,995	26	20.8	7	26.9	1		3			1		1		1	3					1		1
*New Haven.....Conn																							
Providence.....R. I	116,755	39	17.1	9	23.0			12	1	2	2	1				3		1					
Total	681,282	276	20.8	73	26.4	11		53	3	6	11	2	3		3	27		10		1	3		3
Eastern Cities.																							
Albany.....New York	98,430	55	28.6	15	27.2	5		9	1	2	2		1			3	2		1	1			
New York.....New York	1,299,249	669	26.5	229	34.2	26	1	112	15	9	15	3	7	7	11	111		40		10	10	1	9
Brooklyn.....New York	633,763	241	19.7	86	35.6	10		34	7	1	6	4	2	1	11	44		1	2	1	1		1
Hudson Co.....New Jersey	228,025	94	21.8	36	38.2	8		11	3	1	2		3		6	13		1		1	2		
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	24	22.9	7	29.1			3					1		1	1		3					
Paterson.....New Jersey	58,324	19	16.6	10	52.6	1		4								1		2			1		
Philadelphia.....Pa.	907,043	433	24.4	139	32.1	3	1	73	10		24	4	14		9	43	4	12	1			5	5
Reading.....Pa	46,556	21	23.4	10	47.6	1		1			1		1		2	1							
Wilmington.....Delaware	46,889	15	16.1	6	40.0	1		3	1							2							
Total	3,372,291	1,571	23.9	538	34.2	55	2	250	37	13	50	11	29	8	40	219	6	59	4	13	14	6	15
Lake Cities.																							
Buffalo.....New York	168,702	82	25.0	22	26.8	5		14	2	5	8				9	4	2				2	1	
Rochester.....New York	92,116	30	16.6	4	13.3			5	1				1					2			1		
Syracuse.....New York	54,696	19	17.7	5	26.3			3	1	1				1		2	1	2					
*Cleveland.....Ohio																							
Detroit.....Michigan	131,118	52	20.3	27	51.9			5	1		7	1				10	2	3	1		1		
Chicago.....Illinois	597,834	170	14.5	91	53.5	2	1	16	6		8	1	3	1	5	11	3	13		2	4	5	1
Milwaukee.....Wisconsin	135,233	40	15.1	19	47.5		2	5	3	1	4		1	1		3		3	1		2		
Total	1,179,699	393	17.1	168	42.7	8	3	48	14	7	27	2	5	3	14	30	8	23	2	2	10	6	1
River Cities.																							
*Allegheny.....Pa																							
Pittsburgh.....Pa	191,523	69	18.7	16	23.1	9		10		1	1		7			6		2		1	2	1	2
Cincinnati.....Ohio	267,767	155	29.6	67	43.2		1	30	1	2	1	1	1	1	16	27		8		2			3
Dayton.....Ohio	41,648	8	9.8	3	37.5	1						1	1			1							
*Louisville.....Ky																							
Indianapolis.....Indiana	86,529	27	16.1	8	29.4		2	5		1			1			3		2					1
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	22	11.4	7	31.8			5			2		1			3	1	2					
*St. Paul.....Minn																							
St. Louis.....Mo	362,816	147		54		9	1	26	1	2	11	2	1	2	9	11		6			3		2
Total	1,048,309	428	20.8	155	36.2	19	4	76	2	6	15	4	12	3	25	51	1	20		3	5	1	8
Pacific Cities.																							
*San Francisco.....Cal																							
Southern Cities.																							
District of Columbia.. " Wh.	136,471	45	16.6	7	15.5	1		17			1				3	1		1					1
" Col.	71,103	40	29.1	21	52.5	4		11		1						9		1					2
Richmond, Va. Wh.	38,526	20	26.5	8	40.0	1		2								2	1	1			1		
" Col.	29,894	16	29.1	8	50.0	1		1								3		2			1		
Charleston, S. C. Wh.	22,699	9	20.3	3	33.3								1			3	1						
" Col.	27,595	20	37.5	11	55.5	1		1								2	1						
Atlanta, Ga. Wh.	25,583	6	11.9	3	50.0													1					
" Col.	19,221	8	21.3	2	25.0	1		4								1		1					
*Savannah, Ga. Wh.																							
" Col.																							
Nashville, Tenn. Wh.	31,993	11	17.7	1	9.0	4		2													1	1	
" Col.	19,406	12	31.7	8	66.6											4						2	
Memphis, Tenn. Wh.	18,677	12	33.3	2	16.6			5		1								1					
" Col.	14,896	16	52.1	7	43.7	1		6						1			1						
*Mobile, Ala. Wh.																							
" Col.																							
New Orleans, La. Wh.	163,757	71	21.8	16	23.9	2		14	1	7	1			3	1	6		1	2			7	
" " " Col.	59,866	74	72.5	16	21.6	3	1	8		4		1		3	1	6		3			1	17	
Total White	437,706	174	20.3	40	22.9	8		40	1	8	2		1	3	4	12	2	5	2		2	8	1
Total Colored	241,481	186	40.1	73	39.2	11	1	31		5		1		4	1	25	2	7			2	17	2
Total in 34 U. S. Cities	6,960,768	3,028	22.4	1,047	34.5	112	10	498	57	45	105	20	50	21	87	364	19	124	8	19	36	40	29
Week Ending March 10, 1883.																							
North Atlantic Cities						3.9		19.2	1.0	2.1	3.9	0.7	1.0		1.0	9.7		3.6		0.3	1.0		1.0
Eastern Cities						3.5	0.1	15.9	2.3	0.7	3.1	0.7	1.8	0.5	2.5	13.9	0.3	3.7	0.2	0.7	0.8	0.3	0.9
Lake Cities						2.0	0.7	12.2	3.5	1.7	6.8	0.5	1.2	0.7	3.5	7.6	2.0	5.8	0.5	0.5	2.5	1.5	0.2
River Cities						4.4	0.9	17.7	0.4	1.4	3.5	0.9	2.8	0.7	5.8	11.9	0.2	4.6		0.7	1.1	0.2	1.8
Southern Cities, White						4.5		22.9	0.5	4.5	0.5		0.5	1.7	2.2	6.8	1.1	2.8	1.1		1.1	4.5	0.5
" " Colored						5.9	0.5	10.6		2.6	0.5	0.5		2.1	0.5	13.4	1.0	8.7			1.0	10.2	1.0
Feb. 24,—Total in 28 English Cities	8,620,975	3,757	22.7			125				29	36		68		79					44		9	80
Feb. 24, " 8 Scotch Cities	1,233,088	649	27.4			11				8	17		8		8	138				9			56
Feb. 24, " 16 Irish Cities	854,731	557	33.9			14		61		6	2		5		12	166				3		1	15

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Notes and Abstracts.

Of an urban population of 6,960,768, there died during the week ending March 10, 3.028 persons, which is equivalent to an annual death rate of 22.4, which is slightly less than it was during the preceding week.

For the North Atlantic cities the death rate was 20.8; for the Eastern cities 23.9; for the lake cities 17.1 for the river cities 20.8; and in the Southern cities, for whites, 20.3 and for the colored 40.1.

Consumption caused 19.2 per cent. of all deaths in the North Atlantic cities; 15.9 in Eastern cities, 12.2 in Lake cities, 17.7 in river cities, 22.9 in Southern cities for the whites and 16.6 for the colored.

Diphtheria caused 3.9 per cent. of the deaths in the North Atlantic cities, 3.1 in Eastern cities, 6.8 in the lake cities and 3.5 in the river cities. The high rate from this disease in the lake cities would be decidedly higher if croup were included, since the deaths reported as due to croup form 3.5 per cent. of the whole in this region.

Typhoid fever caused one per cent. of the deaths in the North Atlantic cities, 1.8 in the Eastern cities, 1.2 in the lake cities and 2.8 in the river cities.

Scarlet fever caused one per cent. of deaths in the North Atlantic, 2.5 in the Eastern, 3.5 in the lake, 5.8 in the river, and 2.2 in the Southern cities.

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PITTSBURG, PA.—Dr. Snively reports three new cases of small-pox.

BOSTON, MASS.—C. E. Davis, Jr., reports 24 cases of diphtheria, 23 of scarlet fever, five of typhoid fever, and one of small-pox.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 15 new cases of scarlet fever and nine of diphtheria.

DETROIT, MICH.—Dr. O. W. Wright reports 26 cases of diphtheria and 21 of scarlet fever.

SANDWICH, ILL.—Dr. Nahum E. Ballou reports the continuance of scarlet fever.

PEABODY, MASS.—Dr. Chas. C. Pike reports an extensive epidemic of measles; owing to severe weather, probably, several deaths have occurred therefrom.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths during the week ending March 10. No mortality from zymotic diseases.

BALTIMORE, MD.—During the week ending March 10 the deaths numbered 188 as against 140 during the corresponding week of last year; males 97, females 91; under five years, 65; over 60 years, 35. Annual rate, as calculated by the local authorities, for the whole population 23.90; for the whites 21.00; for the colored 40.73. Small-pox caused 15 deaths, consumption 37, bronchitis three, pneumonia 17, congestion of lungs one, croup seven, diphtheria 13, diarrhœal diseases three, puerperal fever one, erysipelas two, scarlet fever two, malarial fever one, cerebro-spinal meningitis three, and violence seven. No deaths are recorded from measles, whooping cough or typhoid fever.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports for the week eight admissions, one discharge, one death, and 1,338 insane persons remaining under treatment.

MICHIGAN.—Dr. H. B. Baker, Secretary State Board of Health, reports the prevalence of the following diseases during the week ending March 3. Bronchitis, consumption, neuralgia, rheumatism, influenza, intermittent fever, pneumonia and tonsilitis. Diphtheria was reported present at 12 places, scarlet fever at 16 places, measles at nine places, and small-pox (one case) at Detroit.

HUDSON CO., N. Y.—Mr. Avoney's report for the week ending Mar. 3 was received too late for tabulation. The deaths from all causes numbered 106, of which one was caused by accident, 18 by consumption, five by croup, two by diarrhœal diseases, six by diphtheria, one by erysipelas, three by typhoid fever, three by scarlet fever, ten by pneumonia, two by congestion of lungs, five by acute bronchitis, two by pleurisy, one by measles and six by puerperal diseases. No deaths were recorded from cerebro-spinal meningitis, malarial fevers, small-pox or whooping cough.

NEW ORLEANS, LA.—During the week ending March 3, there occurred 124 deaths; whites 71, colored 53. Death rate whites 22.57, colored 45.97. Under five years, whites 19, colored 17; over 60 years, whites 14, colored 6.

Among the whites small-pox caused ten deaths, measles one, scarlet fever two, typhoid fever one, malarial fevers three, diphtheria two, whooping cough one, consumption seven, bronchitis one, pneumonia one, diarrhœa two, puerperal convulsions two and violence six.

Among the colored population small-pox caused 17 deaths, cerebro-spinal fever two, consumption five, bronchitis, pleurisy and pneumonia three each and violence one.

PORT OF NEW YORK. The immigrant report of Dr. Wm. Manlius Smith, Health Officer, for the week ending March 2, states that one convalescent from small-pox and three cases of a suspicious character were taken from the S. S. "Ptolomy," recently arrived from Rio. The three doubtful cases were placed under observation, and on the development of the eruption were sent to hospital at Blackwell's Island.

BOSTON, MASS.—The monthly report for February of Dr. S. H. Durgin, Chairman of the Board of Health, a summary of which will be furnished hereafter, gives a statement of the contagious diseases reported to the Board as compared with that for the corresponding month of 1882:

	Feb., 1883.	Feb., 1882.
Cases of diphtheria,	132	118
" small-pox,	0	7
" scarlet fever,	82	41
" typhoid fever,	22	20

ROCHESTER, N. Y.—In his report for the month of February which will be tabulated hereafter, Dr. Wm. F. Sheehan, health officer, says: "The mortality for February is remarkable for a decrease in the number of deaths from zymotic causes and an increase in the fatal diseases of the local class. In other words there was a diminished number of deaths from diphtheria, while typhoid fevers, the cause of eight deaths in January, disappears altogether from the mortality list. On the other hand, the deaths from acute lung and heart disease almost double those of the same class for January. Attention is directed to the small number of births returned for February, giving an annual rate per 1,000 of 19.9 only. The English tables place the birth rate at 36.00 per 1,000 annually; hence it would appear that Rochester is almost half as prolific as England, or else all Rochester's births are not reported to the health officer. I am convinced the latter is the cause of our small birth rate."

CHARLESTON, S. C.—The annual report for 1882 of the Department of Health, Dr. H. B. Horlbeck, Registrar and Secretary, shows a total of 1,726 deaths; white, males 275, females 279, total 554; colored, males 552, females 620, total 1,172. Estimated population 52,286; whites 25,000, colored 27,286. Ratio per 1,000, whites 22.32, colored 42.91, whites and colored 33.01.

White: Under five years 147, over 60, 120. Accidents caused nine deaths, bronchitis 11, consumption 72, croup four, diarrhœal diseases 27, diphtheria 17, malarial fevers 17, scarlet fever 10, typhoid fever 15, congestion of lungs 13, pneumonia 16, and whooping cough 21.

Colored: Under five years 500, over 60 years 97. Accidents caused 14 deaths, bronchitis 16, croup two, consumption 206, diarrhœal diseases 50 (elephantiasis one), erysipelas one, diphtheria seven, malarial fevers 21, scarlet fever three, typhoid fever 38, puerperal fever four, congestion of lungs 24, pneumonia 58, and whooping cough 59.

ONTARIO, CANADA.—The *Provincial Bulletin*, for the week ending March 3, shows a high degree of prevalence of disease of the respiratory organs. Zymotic diseases show no evidence of increase except in the case of measles. Some schools have been practically closed by its prevalence. Had early precautions been taken by parents and school authorities to prevent the children of infected families attending school, such undesirable results would in most cases have been avoided.

NEW BEDFORD, MASS.—The fourth annual report of the Board of Health of the city for the year ending Dec. 31, 1882, states that the number of death certificates presented and approved has been 606. It is estimated that the population at this time is not less than 30,000, making the death rate not over 20 per thousand. The decrease in the number of cases reported of zymotic diseases is very marked at the following extract will show:

	1880.		1881.		1882.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Diphtheria.....	231	47	85	3	41	5
Scarlet fever	375	47	160	9	67	4

HAVANA, CUBA.—Dr. D. M. Burgess reports 566 deaths for the month of February. Yellow fever caused 10 of the deaths, typhoid fever 13, malarial fevers 24, small-pox two, and diphtheria five. All excepting one of the decedents by yellow fever were inmates of the military hospital.

CITY OF MEXICO, MEXICO.—The report for the week ending Jan. 28 shows 216 deaths (inclusive of three still births); under five years, 90; over 70 years, five No deaths are reported from measles, scarlet, malarial or puerperal fevers. Diphtheria and croup caused three deaths, whooping cough two, typhoid fever 12, consumption 21 and pneumonia and bronchitis 52.

TEHUANTEPEC, MEXICO.—John A. Sutter, Jr. of Acapulco, transmits a report by Consular-Agent Albert Langner, of Tehuantepec, of the epidemic of choleraic disease which prevailed in December last. During the four weeks of prevalence 1,400 people died in a city the population of which was only 15,000. In individual cases the disease ran a course of from two to three days, some, however, were fulminant and reached a fatal issue in a few hours, with many of the symptoms of Asiatic cholera.

BUENOS AYRES, ARGENTINE REPUBLIC.—The *Monthly Bulletin* for December shows a mortality of 598; males 304, females 294; under five years 375, over 60 years 39. Small-pox caused 97 of the deaths. measles 11, scarlet fever two, croup and diphtheria 18, typhoid fever seven, pneumonia 44, consumption 37, whooping cough four, and dysentery eight.

RIO DE JANEIRO, BRAZIL.—Consul-General C. C. Andrews reports for the week ending Jan. 27, 234 deaths in a population of 330,000. Small-pox caused 18 of the deaths, typhoid fever two, pernicious fever eight, and pulmonary consumption 26.

"A few deaths from yellow fever now occur here each week, but no apprehension is felt that the disease will spread as in 1880."

ENGLAND.—During the week ending Feb. 24 the annual rate of mortality in the 28 great towns of England and Wales averaged 22.7 per 1000 of their aggregate population, Brighton giving the smallest rate, 13.6, and Wolverhampton the largest, 32.3. No deaths was referred to any of the principal zymotic diseases either in Brighton or Plymouth. Small-pox caused eight deaths in London. one in Portsmouth, one in Hull. and one in Newcastle-on-Tyne.

London.—Births 2,759, deaths 1,554. The annual mortality rate which had been equal to 21.7, 21.5, and 20.1 in the three preceding weeks was this week 20.5. Small-pox caused six deaths (and two in the suburban districts) measles 28, scarlet fever 36, diphtheria 18, whooping cough 28, typhus one, typhoid fever 13, diarrhœa and dysentery 12, and violence 54. The deaths referred to diseases of the respiratory organs, which had been 390 and 401 in the two preceding weeks, declined to 366 or to 161 below the corrected weekly average.

SCOTLAND.—During the week ending Feb. 24 the death rate in the eight principal towns was 27.4 per 1,000, or 4.8 above that for the corresponding week of last year and 1.6 above that for the previous week of the present year. Aberdeen gave the lowest rate, 16.6 and, Glasgow the highest, 33.3, whooping cough continues to be the most fatal epidemic, the mortality from it being greatest in Glasgow, Dundee and Greenock, where 32, 11, and six deaths, respectively were referred to it.

Edinburgh.—Total deaths during the week 91; rate 20.0. Diphtheria caused four deaths, whooping cough two, diarrhœal diseases two, acute lung diseases 16, and violence two. No death was registered from small-pox. measles, scarlet fever or typhoid fever.

IRELAND.—Consul A. B. Wood of Belfast transmits with his report the return of the Registrar-General for the week ending Feb. 24.

Dublin.—Mortality 232. Annual rate 34.5. No deaths are reported from small-pox, measles or scarlet fever. Typhus fever caused four deaths, enteric fever three, whooping cough nine, diphtheria one, consumption 21, acute lung diseases 73, and violence six.

Belfast. Mortality 137. Annual rate 33.3. No deaths are recorded from typhus or diphtheria. Small-pox caused one death. measles two, scarlet fever ten, whooping cough six, enteric fever and dysentery two each, consumption 18, acute lung diseases 35 and violence six.

PARIS, FRANCE.—During the week ending Feb. 21 1,198 deaths were registered; males 620, females 578; under five years 353, over 60 years 255. Annual rate 27.79. Typhoid fever caused 34 deaths, small-pox 11, measles 23, scarlet fever two, whooping cough seven, diphtheria and croup 38, erysipelas six, puerperal infection three, consumption 224, bronchitis 52, pneumonia 95, and violence 26.

On Feb. 18 there remained under treatment in the hospitals 78 cases of small-pox, 359 of typhoid fever and 49 of diphtheria.

The continued high mortality is due to the fatality of acute and chronic diseases of the respiratory organs.

LYONS, FRANCE.—Consul B. F. Peixotto reports for the week ending Feb. 10 the occurrence of 210 deaths in a population of 376,000, all due to consumption, in excess of the number of the previous week.

RHEIMS, FRANCE.—Consul Jno L. Frisbie reports 46 deaths for the week ending Feb. 17 males 21, females 25; under 5 years 23, over 60 years eight; population 93,823. Croup-diphtheria, typhoid and puerperal fevers and erysipelas caused one death each, bronchitis caused eight deaths, pneumonia none, pleurisy one, consumption three. No deaths are recorded from measles, scarlet fever. whooping cough or small-pox.

ROTTERDAM, NETHERLANDS.—Small-pox continues in this city. Of 86 deaths reported by Consul Jno. F. Winter during the week ending February 24 seven were caused by this disease. Thirteen new cases were recorded.

GHENT, BELGIUM.—Vice-Consul A. Lefebvre sends the report for the month of January. Deaths 371. Population 136,923. Small-pox caused two deaths, typhoid fever seven, consumption 41, bronchitis 63, diarrhœal diseases 59. In view of the occurrence of the small-pox cases the mayor of the city has issued a notice calling upon the people to get vaccinnated.

During the year 1882 there were registered 4,613 births; males 2,318, females 2,295, and 3,283 deaths exclusive of 167 still-births; males 1,686, females 1,595.

BRUSSELS, BELGIUM.—The bulletin for the week ending February 17 records 175 deaths in the city and its suburbs, equal to an annual rate of 22 o per 1,000. The deaths under five years numbered 50. Small-pox caused five deaths, measles two, scarlet fever one, croup three, typhoid fever three, whooping cough one, diarrhœal diseases 15, bronchitis and pnenmonia 28 and consumption 23. The births during the week numbered 298 equal to an annual rate of 37.1 per 1,000 living.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits report for the week ending February 10 which shows 106 deaths; males 50, females 56; under five years 39, over 60 years 12. Annual rate 31.7 No deaths are reported from small-pox, whooping cough, puerperal fever or violence. Measles caused seven deaths, scarlet fever two, diphtheria and croup four, typhoid fever two, diarrhœa five, consumption 19, pneumonia 15 and bronchitis seven.

During the week ending February 17 the following cases were reported: of dysentery, small-pox, pleurisy, none, of measles 73, scarlet fever 31, typhus fever two, typhoid fever two, puerperal fever one, erysipelas three, whooping cough 11, diphtheria seven, diarrhœa 29, tonsilitis 13, pneumonia ten and acute bronchitis 95.

COPENHAGEN, DENMARK.—There were 125 deaths during the week ending February 13; under five years 60, over 60 years 19. No deaths are reported from measles, scarlet fever, small-pox, typhoid fever or puerperal fever. Diphtheria caused three deaths, croup two, whooping cough five, diarrhœa one, erysipelas one, consumption 16, pneumonia 11, bronchitis 12 and violence none.

The following cases were reported during the same period: measles eight, scarlet fever 20, diphtheria four, croup four, whooping cough 51, typhoid fever three, diarrhœa 104, erysipelas 24, puerperal fever two, bronchial catarrh 508, pheumonia 51 and tonsilitis 165.

VIENNA, AUSTRIA.—Consul-General Weaver sends the report for the week ending February 17 which records 489 deaths, equal to an annual rate of 33.9 per 1,000 of the population. Small-pox caused four deaths, measles none, scarlet fever six, diphtheria five, whooping cough eight, typhoid fever four, typhus fever three, consumption 114, acute diseases of the lungs 90. Of the deaths 167 occurred in children under five years of age.

ST. PETERSBURG, RUSSIA.—Consul-General Stanton's report for the week ending February 10 shows 706 deaths; males 387, females 319 under five years 313, over 60 years 75. Population 929,525. Of the deaths 18 were caused by small-pox and 37 by fever. There remained February 11 under treatment in the hospitals of the city 1,179 cases of fever, 103 of small-pox and 1,248 of venereal diseases.

MALARIA.

FORT MASON, SAN FRANCISCO, *Feb.* 10, 1883.

To the Editor of THE SANITARY ENGINEER:

I enclose two letters from Col. Geo. H. Mendell, of the Engineer Corps U. S. A., which contain observations of value with reference to the malaria question. You are at liberty to use them as you think best.

Yours respectfully, GEO. M. STERNBERG.
Surg. U.S.A.

U. S. ENGINEER OFFICE, NO. 533 KEARNEY STREET, SAN FRANCISCO, CAL. *February*, 2, 1883.

GEORGE M. STERNBERG, M.D., *Surgeon U.S.A.*

Dear Sir:—The allusion you make to animals being subject to malaria, in your last paper in the THE SANITARY ENGINEER, leads me to say that I have been informed more than once by intelligent persons at Bakersfield, Kern County, Cal., that cattle suffer very much from malarious disease on the irrigated lands owned by J. B. Haggin of this city. Very respectfully,
G. H. MENDELL.

U. S. ENGINEER OFFICE, NO. 533 KEARNEY STREET, SAN FRANCISCO, CAL. *January* 20, 1883.

DR. GEORGE M. STERNBERG, *Surgeon U.S.A.*

Dear Sir:—I am led by reading your interesting paper in THE SANITARY ENGINEER on malaria, to give you my own conclusions, drawn from a somewhat extended acquaintance with the great valley of California, over the whole of which malaria prevails, often in most violent forms. It exists in uplands remote from marshy districts,

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and I have known limited districts of upland adjacent to each other, malaria prevailing in one while absent in the other.

Some years ago, while engaged in a study of irrigation then beginning to be applied on the dry plains of California I was led to notice the level of standing water in wells, in reference to which there is a great difference in our interior plains. I soon noticed that shallow wells and malaria were frequent companions. Where the wells were 70 feet, or thereabouts, deep, there was freedom from malaria. Having noticed these coincidences, I afterwards investigated their occurrence in a great many cases by inquiries of farmers, with whom I had conversation. In one or two cases of exceptional malarial districts in the foot hills, which are generally free from this pest, I found the water in the wells near the surface. I do not recall a single instance of shallow wells where the family were free from fevers, always intermittent I believe. I therefore connected the presence of water near the surface of the ground with the existence of malaria. Whether it is due to the mere presence or to the fact that it is drunk, or to both, I am unable to say.

While I hardly hope by this letter to add to the sum of human knowledge on this subject, I believe I do no harm in stating the results of a little investigation, altogether outside of my professional line, which, however, was quite interesting to me. Very respectfully.

G. H. MENDELL.

MORTALITY STATISTICS.

NEW YORK, *Feb.* 27, 1883.

To the Editor of THE SANITARY ENGINEER:

In connection with your weekly reports of the mortality in cities, I read: "The population in this table are calculated to the middle of the sixth half-year from the date of the taking of the last census, that is, to March 1, 1883."

If not too much to ask will you please favor me with—

1st, The date of the last census.

2d, The rule by which you calculate the populations at any given time.

3d, The populations of New York City and Brooklyn, respectively, at date of last census.

A reply will greatly oblige, Yours truly,

R. F. HATFIELD.

[1. Date of last census June 1, 1880.

2. It is assumed that the rate of increase found by a comparison of the census tables of 1870–80 will continue during the ten years '80 to '90. If that rate is x per cent. the increase for the ten years ending June 1, 1890 will be x per cent. of the population as given by the census of 1880, and the increase for any given parts of the ten years will be a proportionate part of the decimal increase. This mode of calculation gives theoretically accurate results at the beginning, middle and end of the decennial period, but during the first five years there is a plus error, while during the last five years there is a corresponding minus error. These estimates are necessarily only approximative.

3. New York City, 1,206,299. Brooklyn, 566,963.

This matter of estimating the population will be discussed in a series of papers on Vital Statistics, which will soon be commenced in THE SANITARY ENGINEER, and a more accurate formula will be given. The method now used is a short and easy one and sufficiently accurate for the purpose to which it has been applied.]

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Sealed proposals for the construction of about two miles of brick and pipe sewers in the city of Waterbury, Conn., will be received by the Board of Sewer Commissioners until two P. M. of Thursday, April 12, 1883, at which time they will be publicly opened and read.

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Forms of proposal and specifications may be obtained and plans seen at the office of the City Engineer, Baldwin's block, Bank street, on and after Monday, March 26. The Board reserves the right to reject any and all bids. By order of the Board of Sewer Commissioners, N. J. WELTON, *C. E.*

March 17, 1883.

DOWN SPOUTS FOR NEW PENSION BUILDING.

OFFICE OF SUPERVISING ENGINEER AND ARCHITECT, 1316 N STREET, N. W., WASHINGTON, D. C., *March* 15, 1883.

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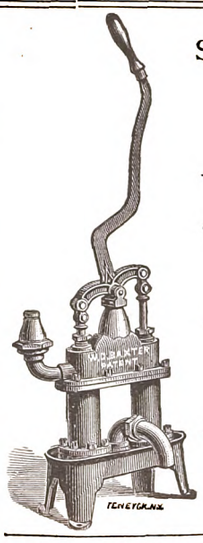

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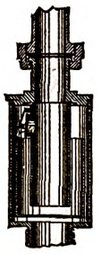

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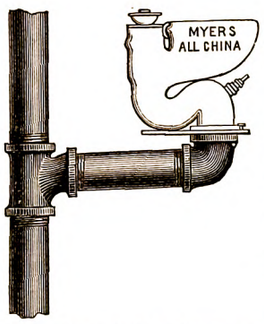

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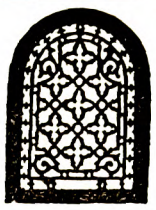
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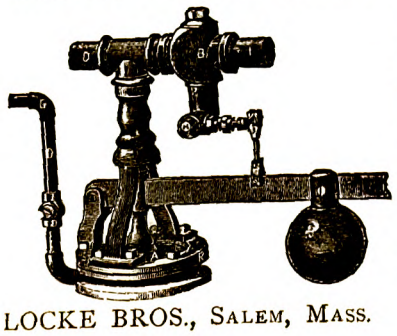
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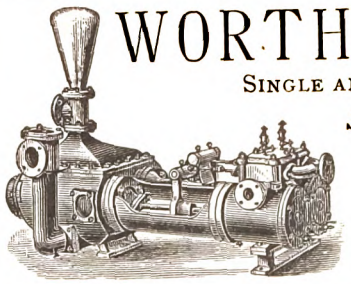
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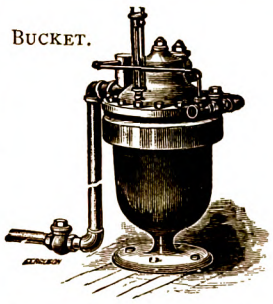
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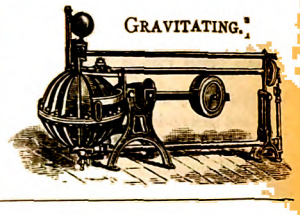

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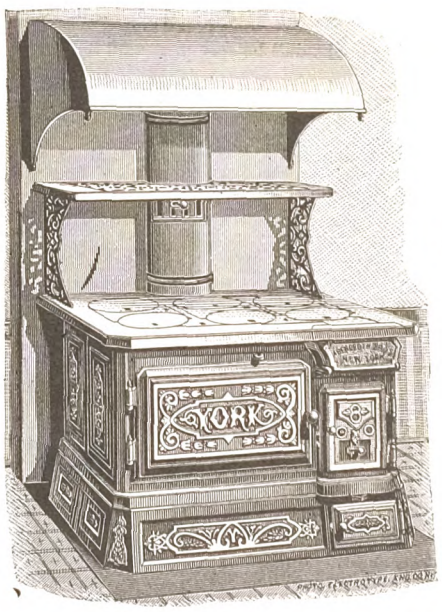
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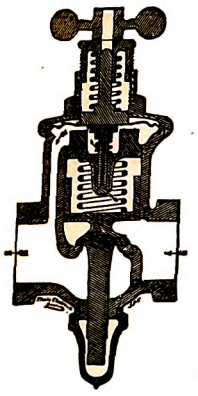

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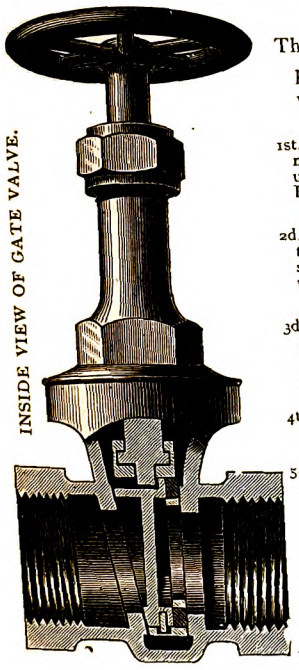

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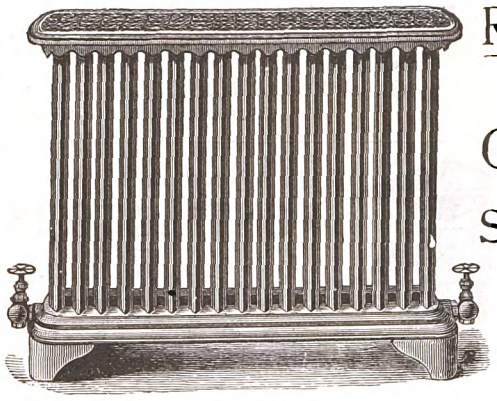

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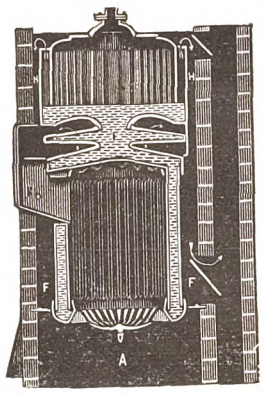

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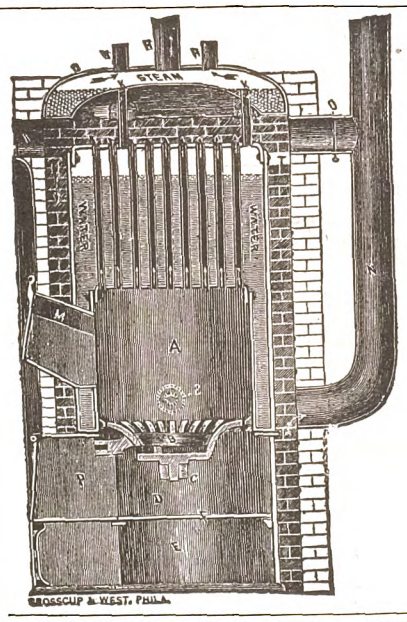

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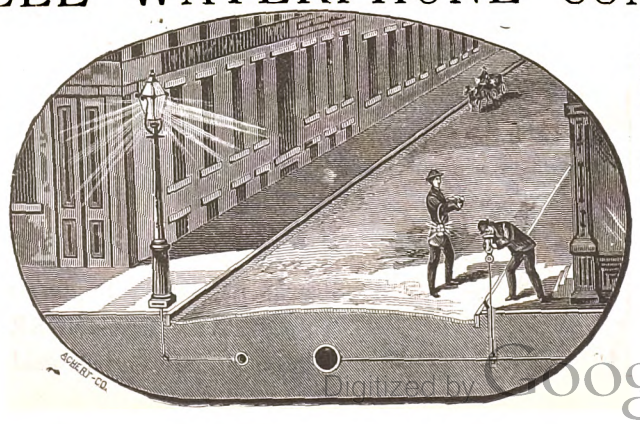

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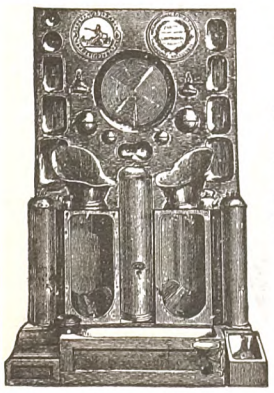

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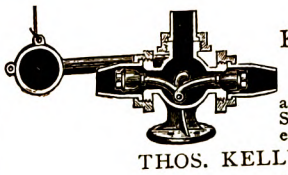

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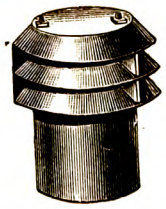

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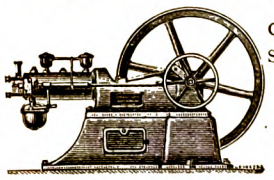

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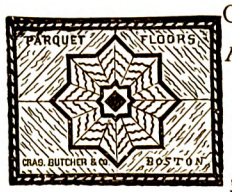

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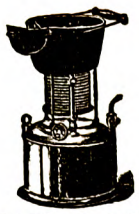

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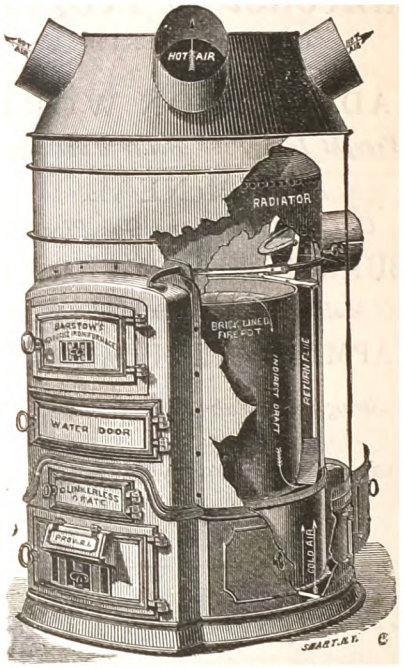

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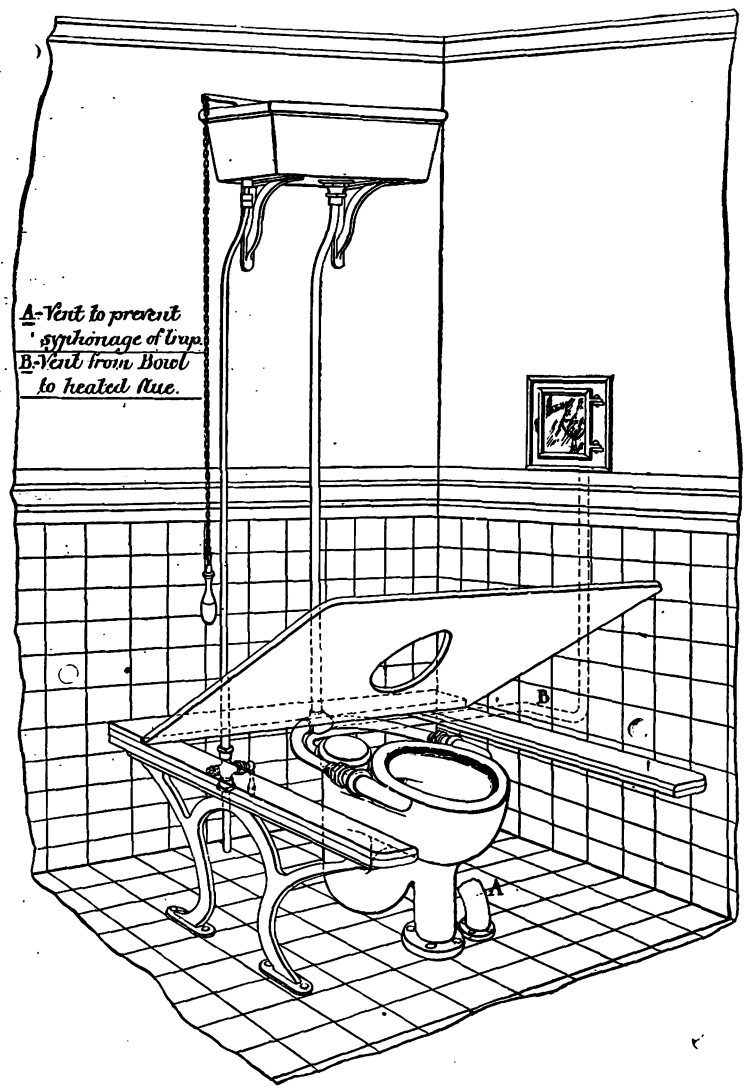

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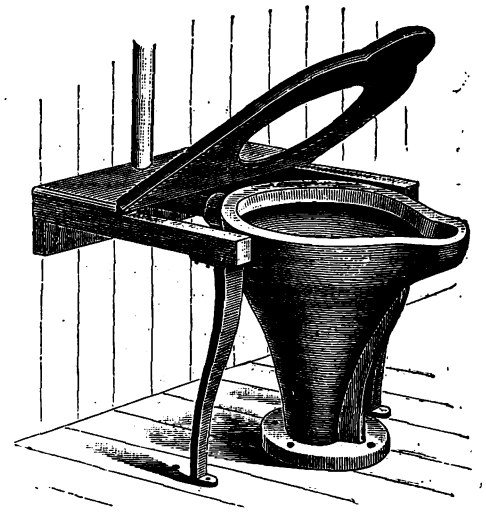

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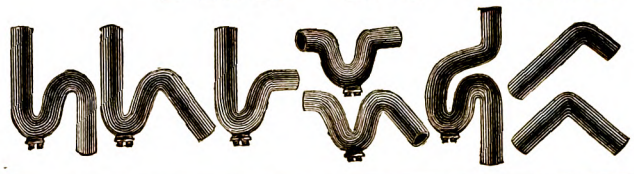

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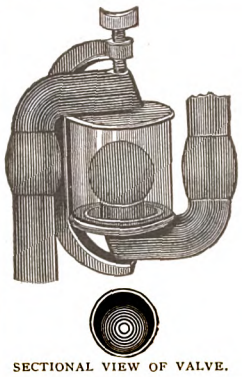

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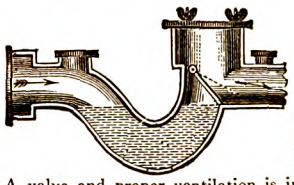

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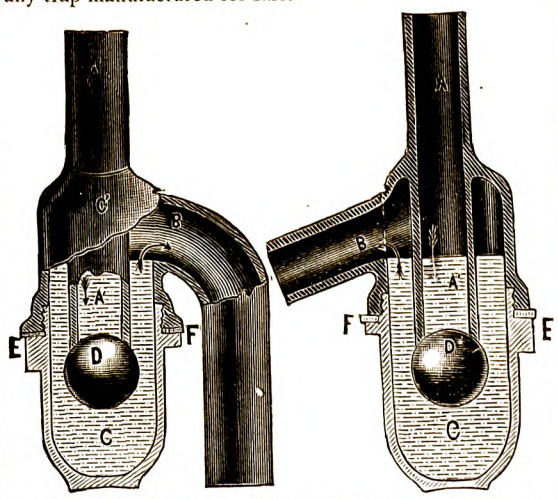

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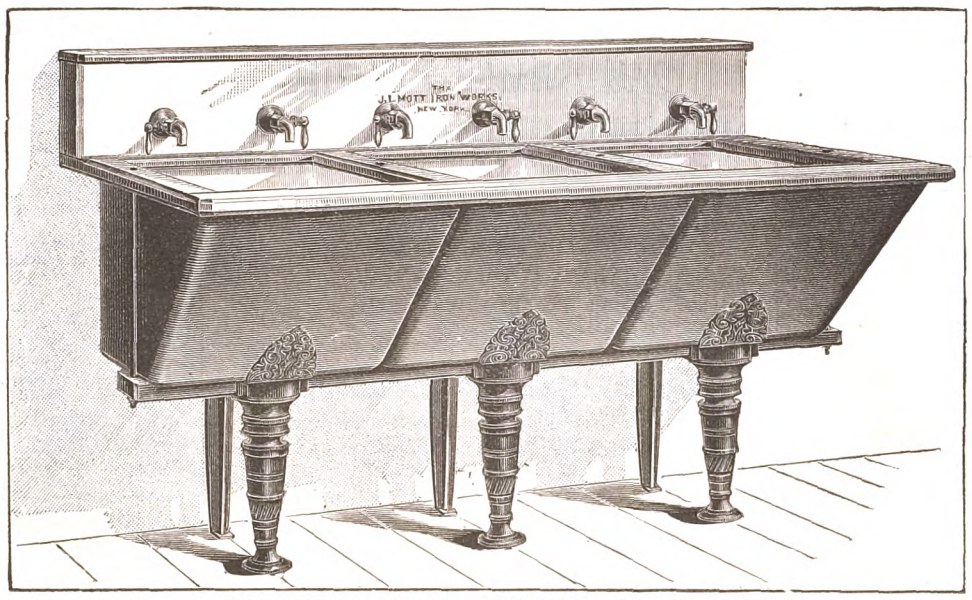

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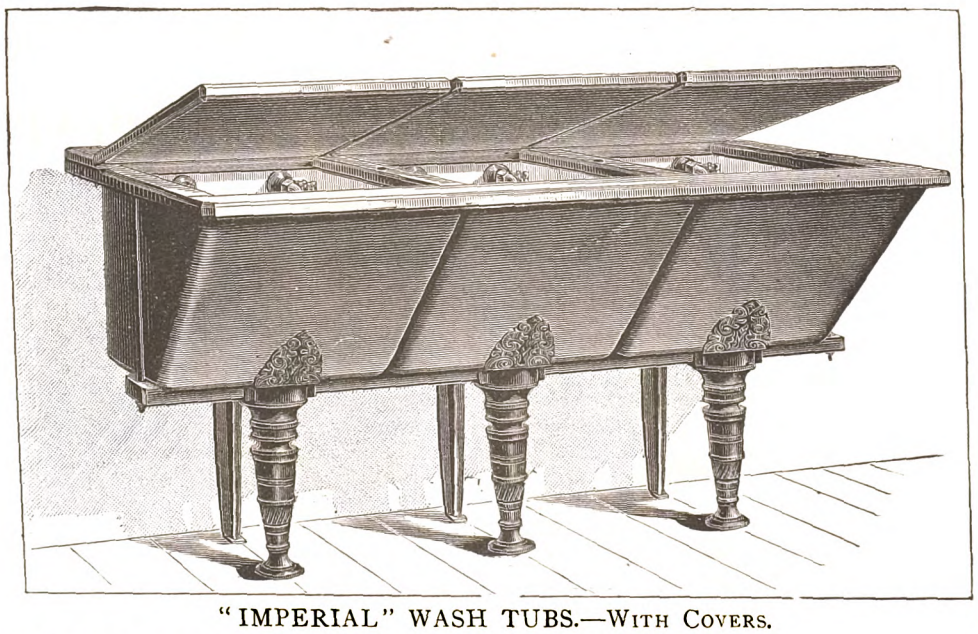

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NOTICE.—Correspondents will prevent needless delays and annoyance if they will address all communications, except those of a strictly private nature, to THE SANITARY ENGINEER. Checks should also be drawn to the same order.

We are of the opinion that a commission composed of Samuel D. Babcock, Edward S. Chesbrough, and Hubert O. Thompson, would construct the proposed new aqueduct and dam at Quaker Bridge in three-sevenths the time and for three-sevenths the amount of money that will be required if the commission contemplated in the Daly bill is intrusted with the job.

A meeting of the Sanitary Council of the Mississippi Valley at Jackson, Mississippi, has been called for the 3d of April next.

The failure of appropriations for the National Board of Health makes it impossible to keep up the Mississippi River Inspection Service on the plan which has proved so successful during the last two years, and the Sanitary Council now becomes an organization of great importance.

This council is composed of representatives of the State and Local Boards of Health of the Mississippi Valley, and its recommendations will no doubt govern, to a great extent, the action of these boards as regards communication with New Orleans during the coming summer.

There is throughout the valley such a profound distrust of the Louisiana Board of Health, such a general belief that it will conceal the occurrence of yellow fever to the last possible moment, and so little faith in the protection afforded by the Mississippi River quarantine as administered under its direction, that much interferance with the rail and river communications of New Orleans is to be feared, unless the council can agree upon some practicable plan to preserve public confidence. If the council finds it necessary, in order to secure this confidence, that inspectors selected by itself shall be maintained in New Orleans and at the Mississippi River Quarantine at the expense of the city of New Orleans, we fancy there will not be much enthusiasm in the latter city over the results of the efforts of its representative, Mr. Ellis, to prevent any appropriation by Congress to meet such expenses.

THE BOSTON PLUMBING ORDINANCE.

Boston has at last joined the ranks of those cities which have assumed municipal control over plumbing. The ordinance governing this matter we published on page 367 of our last issue. Unlike the law for this city, which vested the power to make regulations in the Board of Health, the regulations are there prescribed in the ordinance, and the responsibility of enforcing them is placed with the Inspector of Buildings, who was active in securing the legislation. It is always difficult to secure the passage of a law providing in detail for methods of construction or practice, there always being much difference of opinion about details, and the wrangles about minor ones often befog the legislator who has no special knowledge of the matter in dispute; the result too often is a crippling of the entire movement. Under the circumstances, therefore, Boston is to be congratulated for getting what she has, though it is not all that is desirable.

It is to be hoped, though, that what is prescribed will be so intelligently enforced that the advantages of such a law will be made manifest, and the needed additional authority be granted to the parties responsible for its enforcement.

Section Seven of the ordinance provides as follows:

"SECT. 7. Iron pipes, before being put in place, shall be first tested by the water or kerosene test, and then coated inside and out with coal-tar pitch, applied hot, or with paint, or with some equivalent substance. Joints shall be run with molten lead and thoroughly calked and made tight. Connections of lead pipes with iron pipes shall be made with brass ferrules, properly soldered and calked to the iron.

It is not clear how this can be practically carried out; certainly the oil test cannot be made at each building, and the necessary dipping baths, oven, etc., erected. If the inspector accepts paint, that might simplify the matter somewhat. To apply any other substance hot that would be of any value, inspectors would have to be stationed at the various foundries where pipe intended for use in Boston is made, and such pipe would have to bear some stamp. We are a little curious to see how it is proposed to enforce this section.

Sections 6 and 11 are especially good. We regret, however, that all lines of soil pipe, and the fittings on it, over fifty feet in length were not required to be the standard extra heavy pipe, which is one-fourth inch thick; the pipe specified in the law is too thin for the high buildings now being erected. The additional cost of the extra heavy pipe is only for the value of the iron, the labor being the same, and for reasons often stated in these columns, and which every plumber knows, it should not be for a moment considered when the risks to be avoided are taken into account.

We also regret to see an omission to provide for the fresh air inlet to each house drain. Since the main trap is required, this is a very serious omission, and should at once be corrected by an amendment. Without this air inlet the house pipes are partially dead ends, and are deprived of the movement of air through them that is so essential. There are plenty of gentlemen in Boston who know the necessity of this, whose opinions are entitled to consideration, and we shall look for the early correction of this oversight or blunder, whichever it may be.

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NEW YORK'S WATER SUPPLY.

No. X.

THE SUPPRESSION OF WASTE.

(Continued from page 362.)

The following letter from the Commissioner of Public Works explains what the Department has been doing in the matter of restricting waste :—

DEPARTMENT OF PUBLIC WORKS,
COMMISSIONER'S OFFICE,
No. 31 CHAMBERS ST., NEW YORK, *Feb.* 21, 1883.

To the Editor of THE SANITARY ENGINEER :

SIR :—In answer to your inquiries in reference to the subject of waste water in this city, I beg to say :

The first practical steps against waste of water were taken in 1876, by establishing a system of house inspection to detect and prevent leaks in plumbing and willful waste in letting water run from faucets unnecessarily.

The next step was the abrogation, in 1877, of the contract or license system of supplying water to shipping, and for building purposes, by which immense quantities of water were wasted along the water front and in the erection of buildings. This service is now under the immediate supervision of competent inspectors, and the greater portion of the water supplied to shipping is measured by meters.

The last and most effective measure against waste is the use of water meters. On January 1, 1877, there were only 260 water meters in use in the city. In 1877 and 1878 the number was increased to 922 ; in 1879 to 1,398 ; in 1880 to 4,002 ; in1881 to 5,293 ; and at this date there are 6,924 meters in use.

The expenditures for the various measures for the suppression of waste are paid from the appropriation for "Repairs and Renewals of Pipes, Stop Cocks, etc.," which is the appropriation for the repairs and maintenance of the entire distributing system, comprising 531 miles of water pipes, with 5,613 stopcocks, and 6,944 fire hydrants.

The Department estimate for this appropriation for the year 1883 was as follows :

Four Repair Companies, each consisting of 1 Foreman, 2 carts, and 21 mechanics and laborers	$82,000
One gang of mechanics and laborers, employed in placing taps in water pipes, and cutting off taps for non-payment of water rents, waste of water, etc	24,000
For new 12-inch and 6-inch pipes, stop cocks, hydrants, fixtures, materials and supplies for renewals and repairs	122,000
For services of Engineers, Meter Inspectors, Inspectors of waste, Supt. and Inspectors on Water Supply to shipping, Clerks on Water Meter accounts, etc	72,000
Total	$300,000

The Board of Estimate and Apportionment in the final estimate appropriated only $170,000.

It is evident that with the constant and rapid growth of the city ; the increased demands on the water service ; the addition of from fifteen to twenty miles of pipe each year to the distributing system ; and the wear of the older pipes and stop cocks, the expense of repairs and maintenance must increase from year to year, and the necessity for further suppression of waste, in order to meet the new demands on the water supply, grows in the same proportion.

For years past the appropriations have been inadequate to afford means for the renewal of the old pipes and stopcocks along the water fronts, which are so reduced by corrosion, from contact with salt water, that they are unsafe.

The measures for the suppression of waste began with the places and establishments where the consumption and waste of water was greatest—the docks, gas works, breweries, malt houses, railroads, hotels, factories, large stables, etc. As the work is extended to the smaller and more numerous business places, it becomes more laborious in proportion to the results which can and which must be attained to keep up an efficient supply.

It will be impossible, with the amount appropriated by the Board of Estimate and Apportionment, to perform the various work and duties referred to, to the extent and with that degree of promptitude and efficiency which the situation calls for.

In carrying out the various measures for the suppression of waste of water the Department now employs—

On Water Meters :—

One General Inspector to examine places after they are metered.

Twelve Inspectors to read meters and keep them in order.

One Inspector to test meters in Pipe Yard.

Three Clerks on meter accounts.

On Waste of Water :—

One General Inspector.

Eighteen Inspectors to examine plumbing in buildings.

Four Inspectors to examine house drains in sewers at night.

One Inspector to examine new buildings.

One Inspector to visit houses where water is found wasting through drains at night.

On Supply of Water to Shipping, etc. :—

One Superintendent.

One Clerk, keeping accounts.

Seven Inspectors, along the water front and at new buildings.

Very Respectfully,
HUBERT O. THOMPSON,
Commissioner of Public Works.

The foregoing omits to state one method adopted to check waste which, after all, is the principal one, aside from the use of the 6,924 meters, that has secured any practical results ; that is, the throttling of the distributing pipe or partial closing of the gates from the Central Park reservoir. The Engineers, some time since, realized that unless they kept the pressure down in the mains, except in case of a fire, the water would be drawn out of the reservoir faster than it could be delivered to it ; in other words, 95 million gallons was all that could run into it in twenty-hour hours. It was therefore necessary to so throttle the distributing pipes as to limit the quantity withdrawn to that amount, or else the city would be without any reserve whatever, a contingency not pleasant to contemplate, with the possibility of breaks in the aqueduct. It may be asked why throttle the pipes and not give us what pressure there is ? We would reply that with the present worn out plumbing and leaking fittings all over this city, and defective pipes under the streets, the leakage would increase as the pressure was increased, and, in our opinion, if a pressure of forty pounds per square inch were maintained throughout the greater part of the city, assuming such a thing possible, the amount of water consumed would be at least one hundred and twenty-five million gallons per day, instead of ninety-five millions as it is now. It is therefore evident that we must do as was done in Norwich, Liverpool, and other English cities, and that is, stop the leaks in the houses and under ground, and keep them stopped, or any additional pressure, when we do get it, will simply increase the waste, and so much of it as soaks in the ground will moisten the soil about our habitations and increase the mortality from lung diseases.

It will be noticed that the Commisioner's letter states that there are twenty-four water waste inspectors besides one general inspector, eighteen of whom are to examine plumbing in buildings. It would be interesting to know how these men occupy their time during the day, for one thing seems very clear, and that is, that from some cause or other these twenty-four men are not working to the best advantage ; and if they are all faithful and competent, there is an evident want of organization and efficiency that needs correction.

No one pretends that the Board of Health Inspectors are overworked, yet a much smaller force have made themselves felt and recognized all over this city.

We have taken a little pains to inquire from those who should know, and we are unable to learn that they have seen or heard of inspectors of plumbing from the Department of Public Works except on rare occasions, and we are of the opinion that these eighteen men are not doing six men's work. We would, therefore, suggest that the Commissioner take about three hours' time some day to investigate the working of this portion of his department ; and we are satisfied that he can institute measures that will secure three times the results that are now or ever have been obtained. This department should demonstrate that it can utilize to the best advantage what it has, before it can with propriety ask for the additional funds and powers that are needed.

With our next article we hope to conclude this series by briefly reviewing the various methods that may be available for checking the abuses from which New York, with other American cities, is suffering, but which at the present time are especially onerous here.

[TO BE CONTINUED.]

DIRECT SUPPLY TO WATER CLOSETS.

We print elsewhere a letter from a plumber of this city, with an illustration, that deserves careful attention. It is probable that the work in this house was begun before the plumbing law went into operation, which was about October, 1881. We have taken the trouble, however, to have a sketch prepared so that all our readers can fully realize the character of the risks incurred when valves on water closets are supplied by branches from the main water supply, from which water for drinking and cooking is drawn. The picture fully illustrates the nasty practice and its very probable consequences, yet water closets are fitted up in this way in great numbers of houses in this city, and aside from the wastefulness of water attendant on this method, the risks to health which have been demonstrated over and over again are such as should compel our health authorities to institute a systematic inspection of all the houses in this city, and they should, as rapidly as possible, require the disconnection of all direct supply to water closets, and the abandonment of the filthy practice that ignorance and cupidity has made so prevalent.

ANOTHER BAD BILL.

The following Bill has been introduced by Assemblyman Roesch, in the New York Legislature, referred to the Committee on Public Health, reported favorably, and is now awaiting passage:

SECTION 1. Section seven, of chapter four hundred and fifty of the laws of eighteen hundred and eighty-one, entitled "An act to secure the registration of plumbers and the supervision of plumbing and drainage in the cities of New York and Brooklyn," is hereby amended so as to read as follows :

§ 7. Nothing herein contained shall authorize the Board of Health of the Health Department of either of said cities of New York or Brooklyn to prohibit the use of vitrified glazed pipe or tile for draining of any building in said cities.

§ 2. This act shall take effect immediately.

We learn that this measure has been quietly put through the Heath Committee, and though it affects the New York Board of Health, they were given no opportunity to be heard, and their knowledge of its existence came from the newspaper notices of the favorable report by the committee.

If it had been referred to a committee, say on "Tile Pipe Manufacture," we should not have been surprised at the action taken ; but how a committee on public health should act on a measure of this kind without consulting the Board of Health, is not explainable on any proper theory.

We do not propose to go all over this tile pipe controversy so far as it relates to the needs and conditions of this city, but we will repeat that the Board of Health, in their regulations permitting its use outside a building, have done all they properly can if the health of the occupants of the houses in this city is to be considered.

The principle involved in legislation of this kind is, however, pernicious, and should not be tolerated. The Legislature has seen fit to place discretion with the Board of Health in the matter of the enforcment of the plumbing law. It is to be supposed that their rules will interfere with some one's desires or interests, and if in every such case a bill is to be passed forbidding the Board to interfere with that interest, the plumbing law had better be repealed. When the fair-minded people of this city, who have only the

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safety of the occupants of its houses at heart, come to the conclusion that the Board are not wisely or properly exercising the discretion vested in them, then let them have that discretion transferred to those capable of holding the trust. This bill is not for the interest of the public. There is now no restriction on the legitimate and safe use of tile pipe here. The bill should not become a law, and if the Sanitary Reform Society will look to it, we are satisfied our legislators will not pass it.

We should add that this measure has received the condemnation of the Mayor's cabinet.

A NASTY ARRANGEMENT.

NEW YORK, *March* 20, 1883.

To the Editor of THE SANITARY ENGINEER:

I now live in a house in which the plumbing was finished last July and passed by the Board of Health inspector. On the second floor is a valve pan closet. This valve is supplied direct from the rising main to the pump that is intended to pump water into the tanks and over sinks on each floor above. I have seen the pump up-stairs discharge water over the sink when the water closet below was in use that smelled like the contents of the water closet. Of course the closet happened to be in use at the moment, and the valve being open the suction from the pump above drew the foul air from the closet bowl so that the water was impregnated with it. I thought it was against the law to connect any more closets to drinking water mains. How is this?

1,321 Second av. DANIEL RYAN, *Plumber.*

[A comment on the above will be found in our editorial columns.]

BAD DRAINAGE AND FEVER.

Mr. Keith D. Young, A.R.,I.B.A., lecturing before the Society of Medical Officers of Health in London, to illustrate the connection between bad drainage and enteric fever in hospitals, cited the experience of the London Fever Hospital.

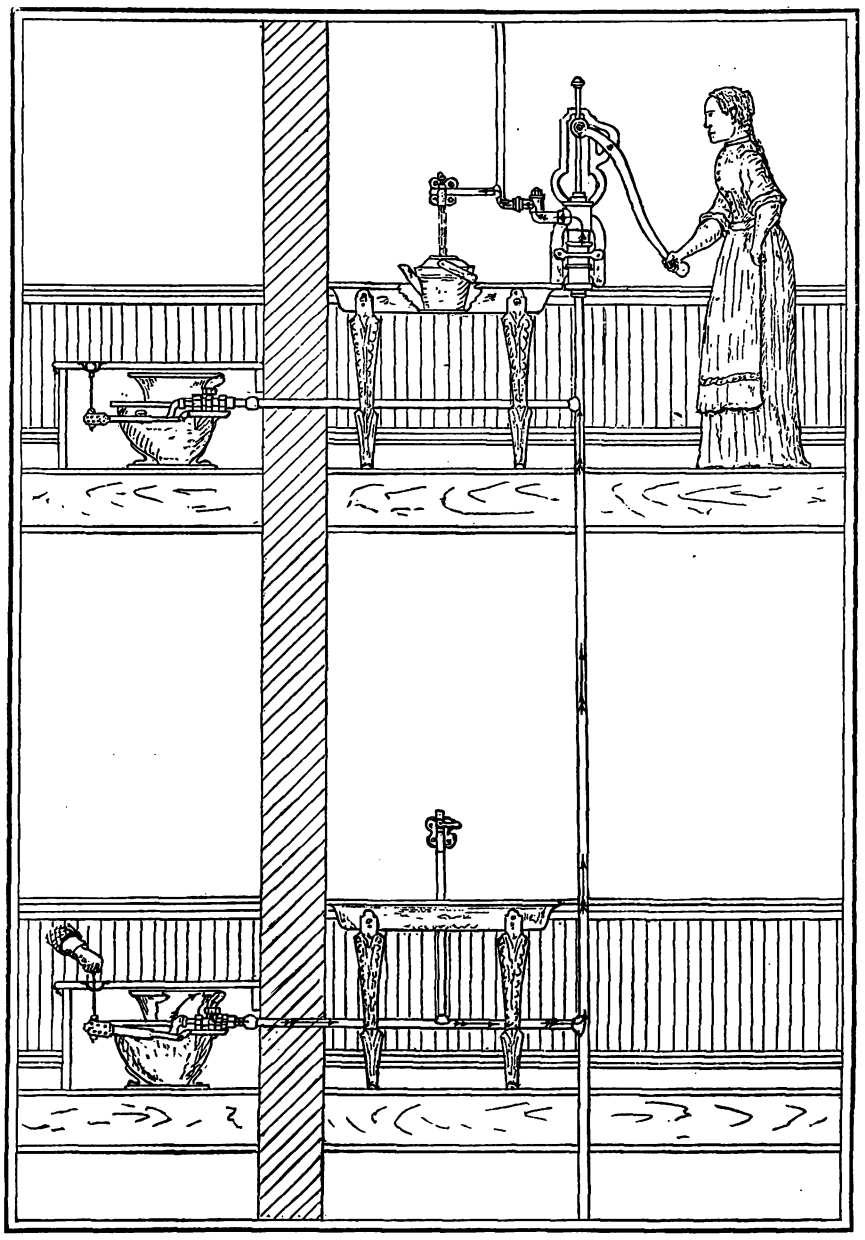
Between the years 1855 and 1878, 5,569 patients were admitted into the London Fever Hospital with enteric fever, and 19 inmates of the hospital contracted the disease. Nine of the cases were accounted for by the occurrence of various defective drainage conditions, or other equally direct causes of infection. Of the remaining ten, three only were nurses engaged in the enteric wards; of one, it is said to be doubtful if she contracted the disease in the hospital at all; the other six were four housemaids, one kitchen maid and one scarlatina patient. While it is unfortunate that no evidence exists to show how these ten cases contracted the disease, it is interesting to note that its co-incidence was slightly greater on those whose duties would not bring them into contact with enteric patients than upon those intimately concerned with those patients.

In the autumn of 1881 three nurses and one ward servant, all engaged in the male enteric ward, contracted enteric fever, and co-incident with these cases successive stoppages in the sluice pan took place. The cause was found to be the accidental blocking of a trap by a piece of slate. The defect was remedied, and no further cases occurred.

The Health Officer of Savannah, Ga., Dr. J. T. MacFarland, has this to say about the connection between the sanitary condition of the city and its plumbing:

"The frequent and most important of unsanitary complaints are those relating to faulty house and sewer plumbing. The houses usually reported by tenants are those in which the plumbing work is old, and I have every reason to believe that most, if not all of these complaints, are unfortunately true. I am informed by plumbers that they very frequently, while repairing or refurnishing house pipes, find joints without cement or filling of any kind, and, consequently, so open as to allow the unimpeded flow of sewer gas directly into the houses. No unsanitary condition of a city demands more vigorous surveillance than does this, and I respectfully suggest that an ordinance be created by the Honorable City Council, which will compel owners of property so reported to have sewer connections of same examined by a plumber (when deemed necessary by the health authorities), and promptly placed in perfect sanitary condition when found defective.

"Sewer gas poisoning, to which is attributed the origin of very many fatal diseases, is now engrossing the attention of sanitarians. It behooves our community to look well to the sanitary condition of their homes; faulty plumbing, decay of or accident to pipes connecting with sewers, will necessarily entail serious consequences."



GERMS AND EPIDEMICS.*

(Concluded from page 341.)

You will notice that Pasteur's method of diminishing the virulence of various germs depends largely upon exposing them to the influence of oxygen.

Recently M. M. Nocard and Mollereau have reported that this same attenuation can be produced by mixing the virus with oxygenated water, but much more rapidly than by the method of successive cultures. (*Bull Acad. de Med.*, 1883, 2 sec. V., XII., p 3).

It cannot be said that Pasteur's claim to have established the general rule that inoculation with artificially modified virus will afford protection against the disease is yet to be considered valid. His methods and conclusions have been sharply criticised by Koch, who is certainly a competent judge, and for the present we must suspend judgement. It will probably at once occur to you that vaccine may be in like manner an attenuated virus of small-pox, in fact, Pasteur calls his method vaccination, and it is claimed by some experimenters that true vaccine vesicles have been produced on cows by successive inoculations of virus derived from small-pox. The question is one of much practical importance, but other skilled experimenters have not obtained the same results, and at present the connection is a doubtful one. It has recently been authoritatively announced that Professsors Schütz and Loefler, of the Imperial German Board of Health, have discovered the pathogenic organism of glanders, have succeeded in cultivating it to the production of spores, and with the results of these cultures have produced the disease in sound horses, which is the scientific demonstration that the cause is really the organism in question.

Of the specific contagious diseases of man in which micro-organisms have been found, one of the best marked is the so-called relapsing fever, a disease which has been known in Ireland for over a hundred years, being known there by the terribly significant name of the famine fever; and which within the last century has several times spread widely in epidemic form over Europe and this country. In the blood of persons affected with this disease there are found micro-organisms consisting of extremely delicate threads, varying in length from two to six times the breadth of a blood corpuscle, twisted into a spiral or cork-screw shape, and moving about actively. They are found only during the paroxysms of the fever, and disappear during the intervals. When a little blood containing these spirilla is kept at the ordinary temperature of a room, the organisms will live for several days, but if this blood be kept at the temperature of the human body, say 98° F., they will die in about 18 hours, while if the temperature be raised to fever heat, 104° F., they will survive only about eight hours. Inoculation with blood containing these spirilla causes relapsing fever in a healthy person, but as yet attempts to cultivate the microphyte outside the living body have not been successful, and spore development has not been observed. In form, size and appearance this spirillum is almost identical with a common microphyte found in foul water, and which also has been found in the mouth of a healthy person, but as yet no connection has been traced.

Among the most interesting and practically valuable advances in our knowledge of the relations of micro-organisms to disease in man, are those which relate to the causation of the various disturbances which occur after wounds and injuries, and which are known as septicæmia, pyæmia, erysipelas, wound fever, and puerperal fever; all of which, it now seems probable, are due to the action of the microphytes which are concerned in ordinary putrefaction, and which are to be found almost everywhere. They do not exist in the blood and tissues of healthy men, but are present in enormous quantities on the skin and in the mouth and alimentary canal. The precise method in which they cause disease probably varies somewhat in different cases. Sometimes they act mechanically by collecting in heaps and plugging the

*A Saturday afternoon lecture delivered at the National Museum, Washington, D. C., Feb. 17, 1883, by John S. Billings, Surgeon U. S. Army.

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smaller vessels, but in most cases they do not multiply in the blood so much as in certain limited localities among the tissues to which they gain entrance through wounds, and it is supposed that the inflammation, suppuration and fever which they produce is due not so much to their mere mechanical presence as to a poison which they produce from the fluids which nourish them somewhat as the yeast plant produces alcohol.

Dr. Ogston, Surgeon to the Aberdeen Royal Infirmary who has for some time been specially studying this subject, thinks that this poison is one of the ptomaines, a peculiar group of alkaloids which are gradually produced in dead bodies by the process of putrefaction. Attention was first called to these compounds in the examination of dead bodies in cases of suspected poisoning when it was found that the application of chemical tests produced results similar to those which might have been expected if the person had been killed by a vegetable poison; in fact, in one case in Italy, the chemists concluded that a man had been poisoned with delphinium, which they supposed they had found in the body, when in fact it was a ptomaine formed in the body after death. Several years ago it was discovered that a decomposing organic fluid, which produced rapidly fatal septicæmia, when injected into the blood vessels of an animal, might be so filtered by passing it through unglazed porcelain, that all the micro-organisms were removed, and that from the structureless liquid thus prepared there could be obtained by evaporation and extraction with alcohol, a substance capable of producing septicæmia and death. This substance was named sepsin, and the ptomaines appear to be much the same thing. In fact, the accounts of the latter in the reports of the French Academy remind one a little of that worthy and learned Professor who discovered that the poems of Homer were not written by Homer but by another man of the same name. These poisons are not themselves capable of growth or reproduction, and it is not certain that they are produced only by microphytes; on the contrary, M. Gautier maintains that he has found them to be common products of the decomposition of our tissues which is a necessary part of life, and that they are found in normal human saliva. If this were true the saliva of a healthy child might be simply one end of scales of virulence of which the others are formed by the slaver of the mad dog or the venom of the cobra. This is, however, not probable, for although human saliva, as contained in many mouths, is very deadly to certain animals, it has been shown that this is due to certain micro-organisms which multiply rapidly in the blood of rabbits and produce death like the germ of chicken cholera, and the virulence of which can be attenuated in the same manner.

The knowledge that the gravest dangers after wounds and surgical operations are due to micro-organisms, which are probably identical with the ordinary bacteria of putrefaction, has led to the careful use of means to destroy the vitality and power for harm of all such organisms which may gain access to wounds. This constitutes what is called antiseptic surgery, and the surgeon now undertakes without hesitation operations which twenty years ago would have been deemed quite unjustifiable, for he knows that by ensuring that neither through the air nor the water, or by the sponges or instruments or fingers, or crevices under the finger nails, there shall be conveyed to the wound one single germ which has not had its powers of growth and reproduction totally destroyed, he need have no fear of blood poisoning. In some of the great hospitals of St. Petersburg, over crowded and unventilated, where you catch the peculiar hospital odor while you are yet in the street, and in which I was told that twenty years ago an amputation of a finger was considered to be a very serious operation, so certain was it to be followed by erysipelas and suppuration, they now perform the most extensive operations antiseptically with excellent results. Not that the bad condition of the hospital does not produce ill effects, but that these effects are of a very different kind from those which used to appear.

About the end of March, 1882, a new form of fever appeared in Aberdeen, Scotland. A characteristic symptom was a swelling of the glands about the angle of the jaw. In a day or two the fever subsided leaving the patient very weak. Usually there was a relapse two days after, and sometimes there were as many as six of these. There were about 300 cases and three proved fatal. It was found that all of them had been using milk from a certain dairy, and that the milk from this dairy contained spores, which when cultivated, produced bacilli. Rats inoculated with these soon died and their tissues were found to be filled with bacilli. Matter taken from one of the sick was found to contain these bacilli, and rats inoculated with this matter died in the same way as the rats infected by the milk. Further investigation showed that the organisms had been added to the milk with water. The observations were made by competent physicians and microscopists and the chain of evidence seems fairly complete. In a communication presented to the Academy of Medicine, Dec. 12, 1882, M. Pasteur states that he has proved that the upper part of the spinal cord of a man or animal dying of hydrophobia is always virulent, and that he has preserved specimens for three weeks which retained their virulence He also claims to have three or four dogs which having once been inoculated with hydrophobia, and recovered, are no longer susceptible. Unfortunately, the great majority of dogs die in the process of rendering them insusceptible. He does not, however, state that he has discovered any micro-organisms peculiar to this disease. With regard to malaria, the latest published researches of importance are those of Professor Ceri. His conclusions are, that it is produced by micro-organisms, the vital properties of which are destroyed by high temperatures and by quinine in the proportion of one to 800 of water. They lose their infectious qualities in the animal organism, but may regain them in the soil under favorable conditions. He considers that it is proved that malaria may be carried by human beings into places hitherto free from malaria, although it is not communicable from one man to another.—(*Philadelphia Medical Times.* Dec. 16, 1882, p. 194.)

According to Lind, the first rains which fall in Guinea are considered the most unhealthy, and they have been known in forty-eight hours to make leather quite mouldy and rotten. Mungo Park observes that three minutes after the rain commenced many of the soldiers were affected with vomiting, and others fell asleep and seemed as if intoxicated.

With regard to diphtheria the evidence is not yet satisfactory, but it seems most probable that it is caused by a micro-organism, which occurs also very commonly in a harmless form and becomes virulent under conditions which are not yet understood. I will refer to but one other form of disease which it is claimed is due to vegetable germs, and that is tuberculosis, better known to you in its most common form—consumption. Dr. Koch has announced that this disease is due to minute motionless bacilli, which can be cultivated outside the human body, but require a high temperature and have a very slow growth. The bacilli are found in the sputa of consumptive patients, and such sputa will produce the disease in animals, nor do they lose their virulence by dying, at least for the period of eight weeks. This tenacity probably depends on the spores, which are formed in the body and not out of it, this being contrary to the habit of bacillus anthracis. Koch produced the disease in animals by inoculation of his culture products; but in the animals chosen for his experiments tubercle is caused sometimes by inoculation of matters which are not tuberculous. This reminds one of an objection made several years ago in the French Academy of Medicine to a report of a somewhat similar series of inoculation experiments. Professor Gubler said they were not conclusive because they had been performed on rabbits, and "the rabbit is a melancholy animal to whom life is a burden and who only asks to leave it." The contagiousness of consumption has long been a disputed point, although the opinion has been growing among medical men that it is sometimes communicated, and statistics contribute a curious bit of evidence in this direction. It is found that of the widows of men dying of consumption the proportion dying of the same disease is larger than it is among widows of men dying of other diseases. Upon the whole, the connection of consumption with a bacillus is still doubtful, though not improbable, and the same may be said with regard to malaria; meaning by this much-abused word the specific cause of intermittent fever.

The bacillus of leprosy was discovered by Dr. Hansen of Norway, in 1874, and has been confirmed by numerous investigations. Dr. White, of Boston, a most competent authority, remarks of this disease, that "its origin is older than history, and it does not appear to have changed for ages. It prevails over large portions of the earth's surface, and we have at present three centres of it in the United States—one in Louisiana, another in the North West, and a third on the Pacific coast, affecting three entirely distinct nationalities, in different climates and under quite diverse methods of life." He believes there is danger of its spread, and that it should be controlled by isolation and by the probibition of the immigration of lepers. The danger is no doubt small—that is to say, there is a very small risk of a very great danger—but it exists, and now is the time to guard against it.

The word germ is used not only to designate independent organisms, which can grow outside the human body, but also particles of living matter which have formed a part of the living body itself, such as at present are believed to constitute the contagion of such diseases as small-pox, measles or scarlet fever, according to what is called the bioplast or graft theory. This use of the word germ is improper and confusing. The graft theory of disease is that a particle of animal matter growing, or capable of growth, (bioplasm) may be transplanted and continue to grow; it will grow normally if it be normal, abnormally if abnormal, and so carry on in the new body the diseased process of which it had formed a part in the old. The results are supposed to be analagous to those observed in cases where from a stock below a graft, fruits and flowers of the kind borne by the scion have appeared, for instance, in the pear grafted on the mountain ash. This analogy did not escape Mr. Darwin, who says, "It is certain that where trees with variegated leaves are grafted or budded on a common stock, the latter sometimes produces buds having variegated leaves, but this may perhaps be looked at as a case inoculated disease."

Because minute organisms are found in the blood and tissues in cases of disease it does not by any means follow that they are the efficient causes of the disease. For example, last July, in Chicago, a boy was seized with tetanus as the result of a wound from the explosion of a toy pistol. Upon examination his blood was found to be swarming with sphæro bacteria. The blood of a horse affected with tetanus was then examined and found to contain similar organisms. Had they stopped there a very pretty theory of the germ origin of tetanus might have been constructed. But they proceeded to examine the blood of the mother and sister of the boy and found that it contained the same forms. Furthermore, after the boy had entirely recovered his blood still was crowded with these bacteria. Wherupon it is suggested that this particular sphæro bacterium, at least, "should be recognized as an altogether pleasant and lovely schizo mycete, dancing away its dizzy life in the vascular channels with a levity born of utter guilelessness. This is called the too-too theory. Nay more, it is claimed that this micrococcus should be regarded in the light of a benefactor. It carried the boy safely through an attack of tetanus and did not desert him when he was convalescent, it sustained his mother nursing with sore anxiety her only son, threw its protecting ægis over another child of the family, and enabled the mother at the same time to attend to the wants of her customers to whom she was in the habit of dispensing a superior quality of lager beer. How can we refuse assent to the proposition that this Chicago bacterium is a good thing to have in the family? In comparison with it how worthless is the prescription of that obliging clergyman, whose sands of life have been running out—lo! these many years."

Some of the relations of meteorological conditions to disease, and especially to epidemics, depend, no doubt, upon the influence which these conditions exert either directly or indirectly upon the growth and development of the lower organisms. As an example of direct influence may be instanced the striking effects of cold upon yellow fever, a single sharp frosty night putting an abrupt end to an epidemic. As specimens of indirect influence we may consider the increase of typhus in cold weather due to over crowding on the part of the poor for the sake of warmth, or the frequent outbreaks of typhoid fever after heavy falls of rain, due to the washing of the infectious particles of typhoid excreta into the sources of water supply. Temperature and light have a powerful influence on the growth of bacteria. Each peculiar organism requires a special temperature which often has very narrow limits. Koch states that the bacillus of tubercle will not propagate at tempertures below 86° F., and therefore it must gain access to the interior of a warm-blooded animal if it is to increase, unless, perhaps, in hot climates.

If we consider the diseases caused by minute animals, we find that the one which has the closest analogies with some of the specific diseases is that which is now known by the name of the parasite which produces it, the *filaria*

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sanguinis. This parasite, which is found especially in China, India, and some parts of South America, is now supposed to be the cause of that peculiar disease known as elephantiasis, which by older writers was often confounded with true leprosy, and the cycle of its change is a curious one. The mature animal is a worm about the thickness of a hair and from two to three inches long, which lives in the water. When this gains admission to the human body, usually by being swallowed with drinking water, it seems to penetrate to the lymphatic system, and there to produce eggs from which are developed thousands of microscopic filaria, which swim freely about in the lymph and blood. Under ordinary circumstances they are only found in the blood at night, in the daytime they seem to collect in the lungs and lymph channels, but if the patient be kept awake at night and sleeps in the daytime, this habit is reversed and they are then found in the blood in the daytime only. So long as the microscopic filaria remain in the body of man they do not develop into the perfect animal; for this purpose it is necessary that they should find another habitation, and this is furnished by the mosquito. Having been swallowed by the mosquito with the blood, the embryo assumes a sort of chrysalis state, and at the end of three or four days escapes from its host, which is then dead or dying and has usually fallen into water. You will perceive that there seems to be a very nice adaptation between the nocturnal habits of the parasite and that of the mosquito. Dr. Manson, to whom we are indebted for most of our knowledge of this filaria, estimates that it is to be found in about ten per cent. of the inhabitants of Amoy, China, its presence causing elephantiasis and various disorders of the lymphatics. Last year a man affected with this disease, which he had contracted in the West Indies, was for six months a patient in the New York Hospital. If any of the celebrated New Jersey mosquitoes got access to him at night and then returned to die in the scenes of their youth, you can see how a new endemic disease might be developed whose progress would be a terrible puzzle if we knew nothing of the filaria. It is also claimed by some observers that malaria and yellow fever are carried and inoculated by the mosquito, but this is yet to be proved. Keeping in mind the limitations of our present knowledge with regard to the causation of disease by minute organisms, and particulate contagion, let us consider briefly some of those acute diseases of communities and nations which are so commonly known as epidemics.

In the popular sense of this word, "epidemic" means that which is prevalent, affecting a large number of people, but it also implies something unusual and temporary. For example, the most widely spread and fatal disease in the United States is consumption, which in the year 1880 caused over 95,000 deaths, or 124.7 per 1000, yet we do not think of consumption as an epidemic disease. Epidemics are commonly divided into the great epidemics or pestilences and the small, local, common epidemics of familiar diseases, but the two forms shade into each other so that it is very difficult to draw any clear distinction. From the earliest times, in all nations of which we have authentic records, there have, from time to time, appeared forms of disease causing wide-spread desolation and death, when the land seems to rest in the shadow of a destroying angel, who leaves no house in which there is not one dead. There is always a certain element of strangeness about these visitations which seem to depend on no known causes, and to have been beyond the limits of human power to foresee or prevent. Not that all such epidemic diseases are of ancient origin; new forms occur, and old ones disappear for centuries, but in every generation there comes a time when the sickle of the skeleton reaper seems to have a keener edge, and to take on a wider reach.

Such, for example, was the great outbreak of the plague which began in Egypt in the year 542 of our era, and which spread throughout the Roman Empire, being known as the Justinian Pest. At intervals of one and two centuries this disease reappeared, following nearly the old track, until at last, in the fourteenth century, after a long absence it seemed to have gathered strength, and starting from China, overran Asia, Europe and Africa, or the whole of the then known world, destroying in Europe alone 25 000,000 of people and well meriting its common name of the Black Death, or the Great Mortality. Truly, if this Oriental pest, the sparks of which still linger in the Valley of the Euphrates, be caused by minute organisms, this outbreak is one of the most striking examples in existance of the power of the small things of this world to confound the great. It is impossible for us to realize the scenes which were then enacted in Europe in the frenzied terror which was universal. Hecker's vivid description is no doubt familiar to many of you. "Merchants, whose possessions were unbounded, coldly and willingly renounced their earthly goods. They carried their treasures to monasteries and churches and laid them at the foot of the altar; but gold had no charms for the monks, for it brought them death. They shut their gates, yet still it was cast to them over the convent walls." In Avignon the Pope found it necessary to consecrate the Rhone, that bodies might be thrown into the river, as the churchyards would no longer hold them. The grass grew in the market places, the rooks and ravens came into the towns and built in the belfries, and silence was universal." It is incidentally noted that when the plague had passed away "the great increase of lawyers was astonishing to whom the endless disputes regarding inheritances offered a rich harvest. Then came, also, moral and mental outbreaks, the processions of the Flagellants, the fanatical persecuting of the Jews, and a little later the epidemic mania of the dance of St. John in Germany and the Tarantula dance in Italy. But I have no time for even the briefest outline of the exceedingly interesting history of the epidemics of the Middle Ages, and will only refer to one other outbreak, which presents many singularities, namely, the sweating sickness. This disease appeared in England just after the battle of Bosworth field, in 1483, and rapidly spread over the kingdom. It was a violent fever, followed by a profuse and fetid perspiration, the whole crisis being over in a day and a night. It attacked especially strong and robust men, killing them in a few hours.

The whole outbreak lasted about five weeks, and it passed away as suddenly as it came. One attack gave no security against another. The disease again appeared in a mild form in 1506, in a severe form in 1517, and again in 1517 when it spread over Northern Europe. It then entirely disappeared for 23 years, when it broke out again in England with its old malignancy, four and twenty hours being decisive of the event. Since the autumn of 1551 the sweating sickness has but once appeared in its rapid and malignant form, and then it was in a very limited area. This was in Roettingen, a small town of Franconia, in the fall of 1802. The visitation was quite characteristic, but it lasted only ten days and ceased with the advent of clear, frosty weather. It is exceedingly doubtful whether the various fevers accompanied by profuse perspiration, which many physicians seek to identify with this disease, such as the Picardy sweat or miliary fever, which first appeared in 1718 and has since that time been frequently observed in France and Northern Italy, have really had any relation to the English disease. One of the peculiarities of the sweating sickness was that it began in Western Europe and spread eastward, whereas almost all the great plagues came from the East—from Egypt and far Cathay—for which there was supposed to be some mysterious reason connected with the birthplace of the human race. When, however, we remember that until within a very recent period the civilized world, which alone preserves intelligible records, was confined to the West of Europe, so that epidemics of external origin must almost necessarily have come from the East, and, moreover, that in that East was a swarming population, poor, overcrowded, filthy, and specially liable to famine, which is the great forerunner of pestilence, there seems nothing remarkable in the course taken by epidemics, which, as a rule, follow the lines of travel. This portability of the cause of epidemics, its "portagiousness," as Dr. Gibbs proposed to call it, is a very striking feature of many of the spreading diseases, and is a strong argument in favor of the proposition that this cause must be something which is material and which is not a gas. It is, in fact, extremely difficult to explain the well authenticated instances which we have of the introduction of yellow fever into a place by means of infected bedding or clothing and its steady spread thereafter, in some instances keeping on one side of the street and passing from house to house with the regularity of a postman, at the rate of about 40 feet a day, unless we assume that this poison is not only material and solid; but living; that it may grow and increase outside the body. The old farmer's remark that "Yellow Jack can't go anywhere unless you tote him" is quite true for distances of a few miles, but for a few squares only he seems to be able to get along without assistance.

The sudden development and cessation of some epidmics, such as the sweating sickness, are sometimes urged as being opposed to the idea that living organisms can be the cause of such phenomena, but we have some well observed facts in relation to the sudden development in large numbers of rare and remarkable fungi, or of certain insects, such as the potatoe bug, the grasshopper, or the phyloxera of the French vineyards, to prove that this is not an unprecedented thing. It is, however, by no means true that all epidemics can be supposed to spread in this manner. Take, for instance, influenza, of which more than ninety epidemics have occurred since its first accurately recorded appearance in 1510. Usually the epidemic wave of this disease travels with great rapidity from the north and east towards the west and south, affecting the great majority of the population in its path. It does not follow the lines of travel; when it reaches a place it strikes the whole at once, and there is nothing about it which would indicate that it is in any way dependent upon germs; on the contrary it would seem that its cause must be either gaseous or some form or variation of force.

Cerebro spinal meningitis, which is one of the new epidemic diseases of this century, also approaches influenza in its pandemic character and in the difficulty of explaining its phenomena by any form of the germ theory.

Twice it has broken out simultaneously in this country and in Europe, it is certainly not contagious, and we are almost totally ignorant of the conditions under which it appears, spreads, or disappears. The only theory which will fit influenza and cerebro-spinal fever is the famous one of epidemicity, or the epidemic constitution, which as given by most writers, has a painful resemblance to the explanation given by the bachelor in *Le Malade Imaginaire*, who, when asked how opium produces sleep, replied that it is by a certain sleep-making faculty which it possesses.

An improvement on the epidemic constitution is the theory of Dr. Robert Lawson, who supposes that in connection with periodical variations in the magnetism of the earth there are formed on the Southern hemisphere what he calls pandemic waves, which pass from South to North occupying four or five years in travelling from the Cape of Good Hope to the Irish Coast. The passage of this wave gives rise to malarial fevers in India, the pest in Asia, yellow fever on the tropical Atlantic Coasts, typhus in Germany, typhoid in France, and relapsing fever in Ireland. This idea is varied and improved upon by Mr. Cushing, who, in a paper published in the *International Review* in 1880, supposes that famines and epidemics depend on changes in the sun, indicated by the so-called sun spots which have a cycle of a little over eleven years. It is probable that there is some truth in this idea, which is quite compatible with the germ theory, but the table which he gives to show the coincidences of maximum sun spots and epidemics is something like one of Mr. Vennor's almanacs, it being usually possible to find some kind of an epidemic at some point of the earth's surface within any period of two years. The resemblance to Canadian meteorological prophecies is also seen in the fact that Mr. Cushing predicted epidemics in 1882 to accompany the maximum sun spot period of that year, and that the said epidemics failed to appear. The great objection to all theories of this kind is that they lead the persons who uphold them to overlook or deny the existence of causes much more comprehensible and which can be practically dealt with. First of all there is the influence of contagion which is almost always denied by these theorists. Then there is the influence of the seasons, of uncleanliness, of famine, of poverty and misery in a thousand ways. It is true that none of these will explain the phenomena of some epidemics, why it is that cholera or yellow fever will sometimes spread like fire in the dry grass, and again are stamped out with ease, why scarlet fever is the English pest, and typhoid that of Paris, or why small-pox should at times show a special virulence; but at all events we gain nothing by giving up the problem as insolvable or referring it to an epidemic constitution or a pandemic wave.

Each epidemic is a problem by itself, and when carefully studied it is usually possible to determine some of its causes at least, if not all of them. The recent discoveries in the life history of some of the micro-organisms to which I have called your attention, the fact that variations in nutriment, temperature, air supply, and stage of growth at which propagation takes place may convert one of the most harmless of microphytes into one of the most deadly, seem to give us a clue to the explanation of many phenomena in epidemiology heretofore deemed most mysterious.

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We must also bear in mind the powers of natural selection not only as it affects the germ but the recipient of that germ if we are to understand the periodicity of these affections.

Even in the midst of the most terrible epidemics there are always some who resist its influence, and when it has passed away these are the survivors who transmit some of this power of resistance, with other peculiarities, to their descendants. Where one attack of the disease confers, in case of survival, protection against a second attack, it is easy to see why there should be long intervals of absence of such diseases from a community, but the same follows in a less degree by the laws of natural selection and heredity, even when the disease is one which may recur.

Small-pox still causes great alarm when it appears amongst us, but we can hardly realize the feelings with which it was viewed in the last century throughout Europe. There were published last year some extracts from a register kept from 1728 to 1764 in Kilmarnock, Scotland, a town at that time of between four and five thousand inhabitants.

From this it appears that small pox came round regularly about once in five years. Each epidemic affected all or nearly all who were not disease proof, and therefore its victims were almost entirely children under five years of age, who had come into existence since its last visit.

Those who recovered were disfigured for life. There were in fact, says Dr. McVail, three Kilmarnocks. One had no fear of small-pox for its people had already met it. Some were blind, some were deaf, most were scarred and disfigured. The second Kilmarnock was under the green sod of the church-yard. The third Kilmarnock consisted of a band of about five hundred little children, which had yet to face the most terrible enemy it would ever meet. "One can barely imagine what must have been the feelings of a mother during these visitations. Even when the town was free from pestilence there would be the constant foreboding of its all too certain coming, and when at last the first case occurred, when the doctor was called in and pronounced the disease to be small pox, his words would be heard as a sentence of death to some member of almost every family containing little ones." One of the peculiarities of the great epidemics is that they are often preceded by an unusual prevalence of diseases having somewhat similar symptoms, although quite distinct from the true pestilential affection; thus bowel affections precede cholera, malarial diseases yellow fever, and typhus the true plague; and it is for this reason sometimes extremely difficult to discover the first cases of the epidemic, and to fix the precise date of its commencement.

It is important to remember also that the mere introduction of germs into the living organism does not ensure their multiplication, or the production of disease. The condition of the organism itself has much influence on the result. Some persons cannot be vaccinated successfully, many persons can be vaccinated successfully at one time and not at another, some persons do not contract diphtheria or scarletina or yellow or malarial fevers although fully exposed to their causes. Pasteur has certainly made a hasty generalization in declaring that the only condition which determines an epidemic is the greater or less abundance of germs.

I hope that as I have indicated a few of the many points upon which our knowledge with regard to these disease germs is still imperfect, it has occurred to you that some of these could be settled by experiment; and that you have felt a certain degree of impatience on learning that these experiments have not yet been made, and that we must still suspend judgment.

I hope also that you may appreciate the importance of having these researches made, that they should be made for the benefit of the world, and when I tell you that the governments of England, France and Germany are employing the best talent they can get and furnishing money for this purpose, while your own country has stopped a series of most promising investigations of this kind, which were being carried on by some of our most competent scientific men, and has deliberately resolved to confine national public health work to paying bills of quarantine inspectors *after* the epidemic has made its appearance. I think you will feel a certain sense of — well, never mind, what it is a sense of—but I think you will feel it all the same I find however, that I am on the verge of making some "practical" remarks, which I wish carefully to avoid.

At all events we have learned enough to know that the life which is born of, and nourished in, death and corruption may become the cause of disease and death in higher organisms, and that, too, to an extent in comparison with which the ravages of war sink into insignificance.

The possibilities which exist in one of these tiny crystal rods or spheres we have as yet only begun to comprehend, but as we come to understand them, the wonder seems to be, not that so many die, but that so many of us are left alive.

Yet, if we turn from limited localities and consider the life of the great races of the earth, we find that everywhere the gain is greater than the loss, though nowhere is it so great as in our own country.

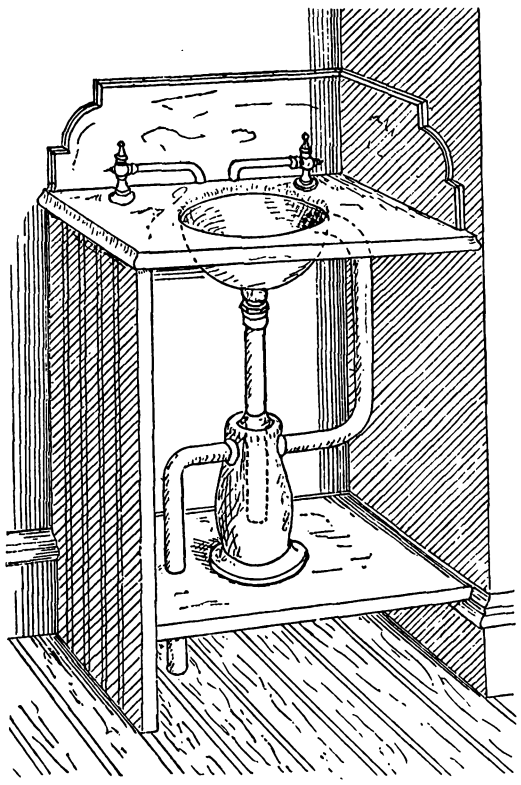
If we suppose that each of the little crimson disks which keep up a ceaseless waltz through the blood vessels of the growing boy has individual consciousness, we can imagine that their views of their environment and its probable future might be by no means clear. They see new corpuscles entering the dance every moment—from whence they know not—and, in a little time, they are disintegrating and passing away. It seems like an enormous waste of generative and formative force, but by and through this apparent waste the boy becomes a man. In his turn he plays his little part in the development of the race and goes over to the majority.

In the words of the Rubayat—

> "'Tis but a tent where takes his one day's rest
> A Sultan to the realm of Death addrest;
> The Sultan rises, and the dark Ferrash
> Strikes and prepares it for another guest.
>
> "And fear not lest Existence closing your
> Account and mine, should know the like no more.
> The Eternal Sâki from that Bowl has poured
> Millions of Bubbles like us, and will pour."

A WORSE THAN USELESS TRAP.

The accompanying drawing shows what was found in an up-town house in this city, by a plumber who was called in to mend some leaky pipes. The pipe from the basin is supposed to extend down into the "round" or "bottle" trap, as is indicated by the dotted lines. The overflow pipe entered the trap above the water line, at the same level as the outlet, as shown, and the plumber who discovered the case and reported it to us stated there was a draft out of the overflow strong enough to blow out a



candle. When our representative went to verify the matter he found the overflow closed by paper carefully pasted over it on the inside of the basin. This had been done by the occupants to keep out the smell, which was reported to be very bad.

Correspondence.

TILE DRAINS.

COLORADO SPRINGS, *March* 12, 1883.

To the Editor of THE SANITARY ENGINEER:

In laying some tile recently we came in contact with several small springs in line of the trench, which tile empties into the bed of a rapid mountain stream. There are springs walled in on both sides of the stream above within 200 yards of where the tile was laid.

Some days after the work was done water began running from the inside. There has been no connection with any fixtures. The tile was good vitrified drain tile laid in cement, each joint carefully made.

Perhaps it would be well to state that the above is to convey the waste from a bath house containing nineteen tubs, two closets, one swimming bath and a few bowls. Question, is it not *probable* that some of the tile is not thoroughly glazed and allows sepage? Also, please state if you consider it detrimental or objectionable to leave it as it is. Water turned in from the upper end of waste passes off promptly and *perfectly* free.

A reply through your columns would greatly oblige,

A READER.

[We should not consider the probability of the water soaking through imperfect glazing so great as that of its coming through imperfectly closed *joints*. Few masons who put pipe together are aware how difficult a thing it is to ensure the tightness of all the joints. Whenever a test is applied the number of leaks developed is astonishing.

If imperfections in the glazing exist to a sufficient extent to account for the flow above reported, they will be likely to be silted up and stop the flow after a few months. We should advise having your pipe tested by applying a tight rubber plug at the lower end and filling it with water. If any bad joints exist they can be found readily in this way. Of course, there should not be much earth filled over the pipe where such a test is made. Leaks often occur by breaking down the pipe, and splitting the bells or hubs open with the load of the trench filling, for lack of good continuous bearings. The pipe should be bedded in cement the whole length of every piece, to ensure good support.

The objections to using a leaky pipe for drainage are these, viz.: Whenever a dry time occurs the sewage will flow out through the leaks and pollute the soil. The importance of such pollution is entirely a local question. Moreover, the escape of the more fluid parts of the sewage through leaks would, perhaps, lead to trouble for lack of flushing the inside of the drain pipe and allow it to accumulate solid matter.]

SIZE OF BASIN WASTES.

To the Editor of THE SANITARY ENGINEER:

What do you consider the proper size for wash hand basin waste pipes? Is it well to have so great a difference as is common between the outlet of the basin and the trap? Would not the latter be more thoroughly flushed and kept cleaner if the hole in the bottom of the basin and the coupling connecting it with the waste pipe were of the same size as the latter? Do you approve of bars or strainers over the outlet of basins and baths, and of the ordinary plug attached to a chain? Is there any way of doing away with the latter without using a patented device?

Yours respectfully, PLUMBING STUDENT.

[The outlets of basin plugs could with advantage be larger. It is necessary to have the strainer to keep articles from dropping in and choking up the trap. The ordinary Boston Waste Cock is not patented, though the fact of a device being patented should be no objection to its use. You will find this subject fully discussed by "Sanitas," in his articles on pages 36, 71, 92, of Vol. IV.]

A PLUMBING SPECIFICATION ONLY IN NAME.

MACON, GA., *March* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

I enclose you a plumbing specification showing what was thought proper and fit for a large educational institution. I desire your candid judgement thereon.

Yours truly, B.

Plumbing.—Furnish and set up in each bath-room on the second and third floors two tin planished copper bath tubs to be 5 ft. 6 in. long; also one in the president's residence, and one in the professor's department.

Water closets.—Furnish and set up as shown on plans, one in the president's residence, two in basement two in professor's departments, four on the second and third floors each, Harrison's turn pan closets with porcelain bottoms and brass fittings. Put on brass fittings to bath-tubs.

Wash basins.—Finish and put into each bath-room one marble top wash-bowl, counter-sink slab and base. Supply all tubs through ¾" iron pipe, also all the wash bowls, sinks and water closets, and waste through inch pipes. Properly trap each outlet separately with full S trap. Supply all bath-tubs and sinks with hot and cold water. * * All the waste from bath-tubs and bowls will discharge into the cast iron sewer pipes which are carried down and discharged into the sewers. * * *

Sewerage.—Furnish and lay down sewer pipes of such material, terra-cotta or cement, as will do the best work, of such sizes and such directions as will be fully shown on

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the foundation or sewer plans, all joints to be thoroughly cemented together.

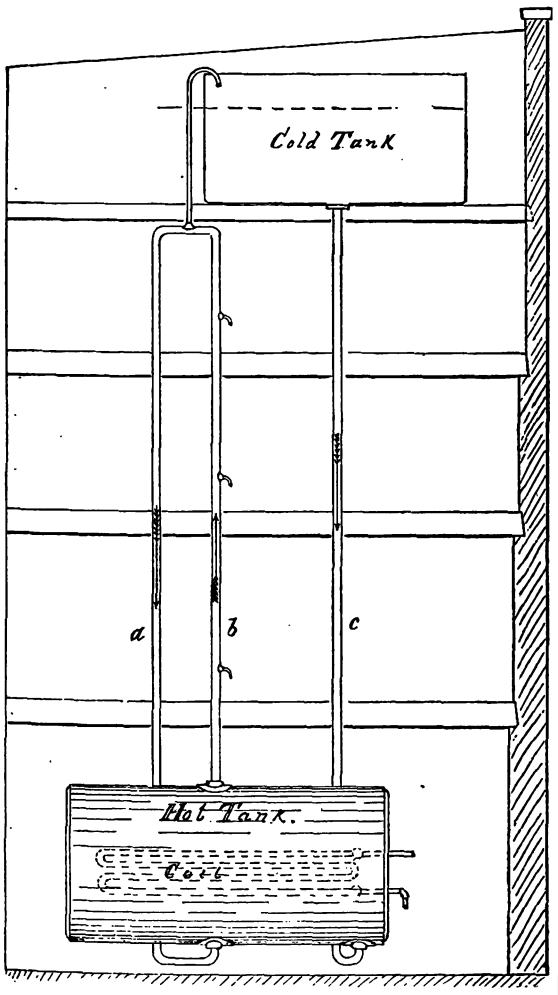
[We do not consider it a specification even in name. It if simply a suggestion to the contractor that the committee expect certain appliances to be located in different parts of the building, leaving it for him to decide what he will put in and how he will do work. If they do not get a wretchedly poor and dangerous job done, previous experience under like circumstances will count for nothing. To offer such a memoranda as a plumbing specification in the light of present knowledge on the subject is disgraceful.]

HEATING WATER FOR LARGE INSTITUTION.

To the Editor of THE SANITARY ENGINEER:

In a public institution using a large quantity of hot water it is proposed to have a hot tank in the garret, and to use for heating the water in this tank the steam boiler which heats the building with steam in the winter, a coil being placed in the tank. In summer it is proposed to heat the tank by a small auxiliary furnace in the garret. Will you please give some directions about the arrangements common in such cases? Also whether, as fixtures will be connected with a pipe descending from this tank, it will not be impossible to obtain hot water until the cold water which gathers in the pipe by its cooling has been drawn out, for I suppose you cannot get a circulation in a case like this.

On this account I have recommended to the parties that they had better heat their water in a closed tank in the basement, letting it rise to the reservoir in the top, and



then return to the closed tank, thus always having a circulation. B.

[The annexed sketch shows how we would do this thing, especially in a high building.

The water may be pumped to the cold tank, or should the water works' pressure be great enough, it may be regulated by a ball cock. From thence it will run to the hot tank and will level up again to the same height in the distributing and circulating pipes *a* and *b*. The small pipe over the top of cold tank is an air vent. With this arrangement the water will be always warm at the faucet.

The coil within the lower and closed tank may be one inch pipe for live steam or large pipe for exhaust steam; brass pipe is generally used.

With the hot tank in the top of the house the water will not circulate and be warm; the result will be as you state.

You also say it is proposed to take steam from the heating pipes to warm this tank. There are heating systems you might tap this way and not spoil the circulation, but on general principles it is wrong.]

WARMING CHURCHES.

NEW YORK, *March* 7, 1883.

To the Editor of THE SANITARY ENGINEER:

Should your correspondent in March 1 issue wish further information respecting the system of warming churches by direct radiation by placing pipes in each pew, he need not go so far as Detroit, he will find it much nearer home; Christ's Church, Rye, Christ's Church, Greenwich, Conn., Methodist Church, Mamaroneck, St. James' Church, New Brunswick, N. J., and others in various parts of the country. The system having been in use some fifteen years.

Resepctfully yours,

BAKER, SMITH & CO.

MAN-HOLES FOR UNTRAPPED HOUSE DRAINS.

To the Editor of THE SANITARY ENGINEER:

I inclose a suggestion which I do not remember to have seen, intended to obtain the advantages derived from a trapless main drain, and obviate some of the disadvantages. The great objection is the ventilating of the sewer through the house pipe, and the only method of using the trapless drain which I have observed is to make a continuous pipe from the sewer up to the top of the house, Now I propose to interrupt the drain by a man-hole and to give it foot ventilation as though it were trapped. This man-hole should be built carefully for its specific purpose and have the bottom truly rounded, and as smooth an interior surface as possible obtained by a coating of cement. Just at the lowest part of the man-hole bottom should be turned up a sewer connection made just flush with or a trifle below the general contour of the bottom. The soil pipe is brought into this man-hole, terminating with an eighth or quarter bend directly over the sewer outlet, the man-hole, of course, covered with a perforated cover. Now, I claim less obstruction than if a trap were used, and little liabilty of odors from the sewer, the latter for two reasons, one that Dr. Rozsahegyi found the prevailing air currents to be from the house to the sewer, rather than from the sewer to the house. The other, and more important one, that the soil pipe extending above the roof will exert the same influence on this man-hole as on the ordinary foot ventilation pipe, inducing a current into the man-hole, and up the soil pipe. The sewer air which then enters the soil pipe will be very largely diluted with pure air instead of being in its normal condition, as is the case when the soil pipes go directly to the sewer.

The man-hole should be either under the outer edge of the sidewalk, the plate being set in one of the flags, or just outside the curbing. As to the expense of constructing it, if it be built when the trench is dug to make the connection between the sewer and the house, it should cost not much, if any more, than the man-hole in which the trap is often placed. D.

[The objection to the plan here proposed is that at certain times there would likely be offensive odors from the sewer coming up through the man-hole cover, which, in this instance, is too near the house, and it is hardly safe to rely on the soil-pipe to act as a constant ventilator in such a situation. Rozsahegyi found the prevailing currents away from the house, but his experiments were made at one season of the year; Dr. Soyka, at a different time, found opposite conditions. Indeed, the direction of the air currents, it seems, is controlled by temperature in the absence of the flow of liquids, and it is not safe to assume one direction at all times or under all conditions.]

CONNECTING A SINGLE BOILER WITH TWO RANGES.

LYNN, *March* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

I have connected a 30-gallon copper boiler to two ranges with ¾-inch brass pipes, similar to cut in your issue of December 8, 1881. When the upper range is used alone everything works all right, but when both ranges are in use there is a continual noisy clicking as in steam pipes. I do not wish to make any change if there is no danger, and if you can tell me the cause and remedy you will greatly oblige AN OLD SUBSCIBER.

[The connections have probably been made as indicated by the full lines in the drawing of the issue of Dec. 8, 1881. The noise may be the result of one of two causes. First, the sum of the heating surface of the two water-backs may be sufficient to get the temperature of the water to 212° or above at the side coupling where it enters the boiler, the result being noise, due to the "water hammer" caused by the rapid and intermittent condensation of steam at or just beyond the side coupling. Second, a great difference of temperature between the waters from the two backs. If the water from the upper range back makes steam, and the under one does not and is much colder, the "water hammer" will take place in the side connection at the branch and beyond it.

When the cold water is taken from the street main, so long as the noise remains there is no danger of over-pressure in the boiler, but should it cease while the fires are very strong and no water is drawn, steam might form in the upper end of the boiler, with the usual consequence of driving the water out, etc. This can only happen when the water-backs have too much heating surface. The tank supply with relief pipe, however, obviates this risk.

We prefer a separate side and bottom coupling for each water-back in such cases.]

LEAD JOINTS ON CAST IRON PIPE.

We recently quoted some extracts from the *Journal of the Society of Arts* of a paper by B. H. Thwaite, on the corrosion of iron pipe in proximity to lead joints. This has called out the following replies:

Mr. W. P. Buchan, of 21 Renfrew Street, Glasgow: "Upon reading Mr. B. H. Thwaite's remarks under the above heading, it occurred to me that in his reference to iron railings fastened with lead, which has corroded away near the fastening, he has not drawn any distinction between malleable-iron and cast-iron railings, as to their respective liabillty to said corrosion. I think the cast-iron railings are not so liable to be acted upon as the malleable, and, consequently, the lead-jointed cast-iron pipes will stand better than Mr. Thwaite imagines. So far as the action of general ordinary house sewage upon the interior of cast-iron pipes is concerned, I have seen such, after having been in use many years, quite clear. While, supposing an iron pipe gets choked up, it is often not from rusting of the iron any more than a lead or stone-ware pipe being choked in same circumstances. If the contact of lead with cast-iron pipes were to have the effect of causing the iron to get soon rusted away near the joint, many iron pipes would not have lasted as they have done,"

Mr. W. Bryan, M. Inst. C. E.: "Town sewage does not appear to affect iron pipes with lead joints as much as ordinary water. A short time ago, I examined a number of iron pipes, twenty-four inches in diameter, forming the main outfall from Blackburn to the irrigation farms, and found them perfectly free from rust or corrosive action. These pipes have been laid about a dozen years. I have examined many iron pipes used for sewage, and in every case with the above result. The greasy matters appear to form a coating on the inside of the pipes and thus to protect them. I have also examined water-pipes with lead joints forty years old, and have found them in perfect condition: and others, through which very soft moorland water, having an average hardness of only two and a half degrees, had been supplied, completely filled with rust after thirty years' use. Lead joints are far superior to any others, and no one need fear the action Mr. B. H. Thwaite is apprehensive of."

NEW PLUMBING INSPECTION DISTRICTS.

Two new men, H. D. Dickinson and Alexander Higinbothem, both plumbers, have been added to the corps of plumbing inspectors employed by the Health Department of this city, and the ground redistricted and assigned as follows: Below 23d street, Eagleson; between 23d and 100th streets, west of Fifth ave., Dickinson; between 23d and 59th streets, east of Fifth ave., Golden; between 59th and 105th streets, east of Fifth ave., Hollick; between 105th and 122d streets, east of Fifth ave., Hooper; above 122d street, east of Fifth ave., Higinbothem; and above 100th street, west of Fifth ave., Elliot. Inspector Golden, in addition to the regular work of his own district, reports at the department every morning for special service anywhere in the city, in cases which need immediate attention.

The following violations, most of them trivial and none of a very serious nature, were reported last week: By Eagleson one, Dickinson three, Golden two, Hollick seven, Hooper six, Higinbothem six and Elliot three.

No violations of light and ventilation plans were reported and no cases referred to the attorney.

AN ALDERMAN ON WELLS.

Last week the aldermen of Brooklyn were discussing the propriety of closing all the wells in the city condemned by the Health Commissioner. Those members who spoke generally appreciated the importance of the subject, but there was one exception, whose views were sufficiently original to deserve republication. Ald. Schmitt "hoped the motion to close the wells would not be adopted. He knew something about the analyzing of water. The water in his ward (the sixteenth) was analyzed when it was not clear, because of the chips and other things in it. Repairs had just been made to the pumps. The water was now clear. I can't say anything about the fourth ward; whether the water is unfit for consumption or not. I am speaking of the sixteenth ward, I think if the gentleman has been there, he has been drinking fresh lager beer and knows little about the water. Let them pump *the old stagnant water out of the wells and they will be fit for use.* There may be a water crisis, and then we will want the pumps."

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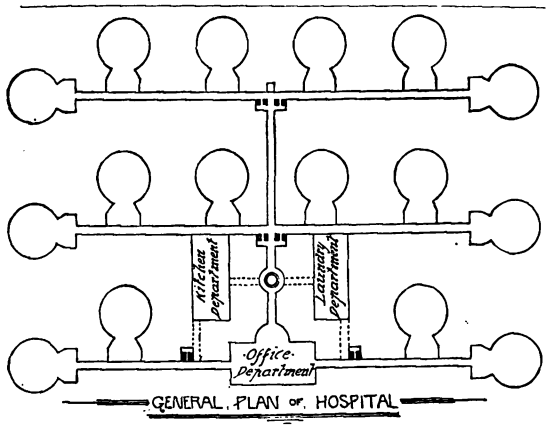
HEATING AND VENTILATING A HOSPITAL.

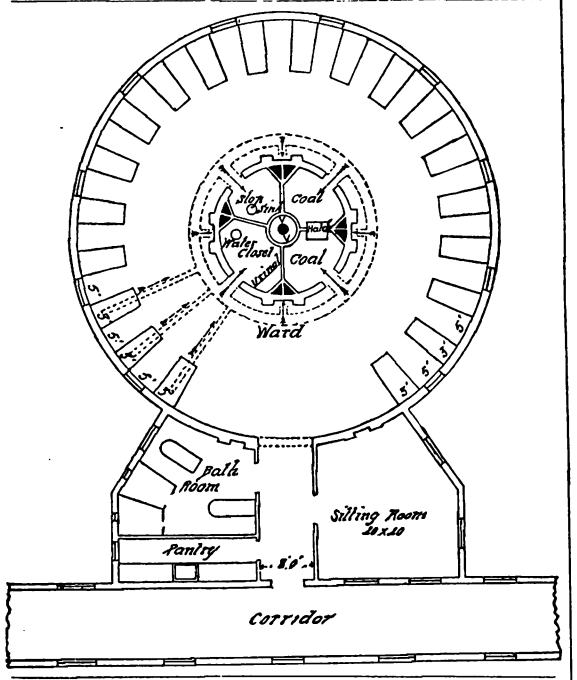
CHICAGO, *Feb.* 15, 1883.

To the Editor of THE SANITARY ENGINEER:

The last number of your paper contained a very interesting article of Dr. Billings on Hospitals. The cut therewith connected, showing a novel plan of an English hospital-ward, reminds me so much of a plan by me six years ago presented to the Cook County Board that I venture submitting the same to you for publication. It does not merely comprise a single ward, but a complete hospital subject to extension as the case may demand. The wards are all isolated, generally two stories, occasionally one story high, all with basement, as demanded by health as well as convenience. The central part is taken up by a room about 18 feet in diameter, containing conveniences,



etc., and four special grates for exclusive heating and partly for ventilating. The main ventilation is effected through the central shaft *V V*, having iron smoke flues in centre. The triangular (shaded dark) shafts, open near the ceiling, carrying the foul air down to the floor of basement, thence into shaft *V*. This ventilation not operating to perfection when the grates are not fired, a special furnace must be connected with the base of shaft *V*, to be used whenever required. Wards for contagious diseases should have a special sort of furnace, to be constantly used in order to destroy the germs. The grates are arranged with metal flues which warm the incoming fresh air (when required to be warmed), and discharge the same into the room through a register located some 9 or 10 feet above the floor. No ventilation should be required through windows; double sash being wanted for the winter season. *Any ward proving to be contaminated should be torn down*



at once and wholly rebuilt with new or disinfected material. I believe that a hospital of some such description would meet a very urgent sanitary demand. To believe, however, that any city or county in this country would ever erect a hospital of this character would be simply nonsense, since it involves no special benefit to the surrounding "property of influencial individuals." What is wanted is a costly and showy complex of buildings with as much reference to use as is therewith practicable. The case is wholly left to individuals of means and humanitarian dispositions.

F. BAUMANN.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
March 24....	27.67	19.54	21.22	30.25	30.23	18.73

E. G. LOVE, Ph.D., *Gas Examiner.*

THE BOARD OF TRADE ON ELECTRIC LIGHTING.

The English Board of Trade has recently issued for consideration certain "model clauses" which are proposed to be inserted in provisional orders and licenses granted by the Board under the Electric Lighting Act.

The following is the clause on "Regulations as to Safety."

"Mains and service lines shall be of a pattern to be approved of by the Board of Trade, and shall be covered with thoroughly waterproof covering, and be contained in pipes or cases of sufficient strength to protect them from injury, and due precaution shall be taken to prevent any insulating material which may be used being rendered plastic or being otherwise injured by the action of external heat. The insulation to be of a durable character, with a resistance of not less than 1,000 ohms per mile run, or such other amount as may from time to time be described by any regulations of the Board of Trade. No conductor in any part of any circuit shall be connected with earth unless such connection is sanctioned by the Board of Trade. The current through any service line shall not exceed —— amperes per square inch of section of a pure copper wire of equal conductivity. The supply of electricity to each house shall be capable of being turned off at some point outside the building. In each conductor of each service line shall be inserted a safety fuse or other safety connection of a pattern to be approved by the Board of Trade. Such fuse or connection shall be situated in a distributing box or at some other point in the service line which is easily accessible, and shall be of such a nature as to cut off the supply when the current through such conductor exceeds by more than 100 per cent. (or of such other smaller proportion as the undertakers may think fit) the maximum current which such service line is intended to supply. The positive and negative poles upon the premises of the consumer shall be at a distance of not less than 3 in., and the terminals shall be of a construction and pattern to be approved of by the Board of Trade, and no portion of any service line which may be upon the premises of any consumer shall contain any joint between the point at which it enters upon the said premises and the said poles. Where the maximum current given to any consumer upon the parallel system exceeds fifty amperes, the supply shall be divided and given at more than one pair of poles, so that the maximum current at each pair of poles shall not exceed fifty amperes, except in such cases and under such conditions as may be approved of by the Board of Trade. Where the difference of potential between any point of any main or electric line used by the undertakers and the earth, or between such point and any other point upon the same circuit exceeds 200 volts, such precaution shall be taken by the undertakers as may from time to time be prescribed by the Board of Trade to prevent such main or electric line becoming electrically connected with or leaking into any main or electric line through which electricity passes at a different potential. Where the difference of potential between any point of any charging main and the earth or between such point and any other point upon the same circuit exceeds two hundred volts, all distributing mains connected therewith shall be fitted with such appliances and apparatus of such pattern and construction as may be from time to time prescribed or approved of by the Board of Trade, for the purpose of ensuring that such mains shall be effectively disconnected and kept disconnected from such batteries during the hours of charging. No portion of any electric line which may be placed by the undertakers above ground, and which is not enclosed within any distributing box or building, shall be at a potential differing from that of the earth by more than two hundred volts. Where any portions of any electric lines belonging to the undertakers are exposed in such a position as to be liable to be struck by lightning, they shall be efficiently protected by lightning dischargers of such pattern and construction as may be from time to time prescribed or approved by the Board of Trade. The difference of potential at corresponding points of the positive and negative conductors used as distributing mains or service lines shall not at any time exceed two hundred volts, and no portion of any such conductor shall be at a potential differing from that of the earth by more than such quantity. The difference of potential at any two points of a charging main shall not exceed four thousand volts, and no portion of any such main shall be at a potential differing from that of the earth by more than such quantity.

Provided always, that if the undertakers at any time desire to supply electricity by agreement at a high tension for the purpose of arc lighting or for any other purpose, the Board of Trade, if they think fit, may relieve the undertakers from all or any of the obligations by this section imposed upon them, and may substitute such other regulations to be observed by the undertakers in relation to such supply as they may think expedient; and all regulations so substituted shall be observed by the undertakers, and shall, for all purposes of enforcement or otherwise, be deemed to have been inserted in this section in lieu of the regulations for which the same are substituted.

ELECTRIC LIGHT NOTES.

The Theatre Royal at Edinburgh will be lighted throughout with electric lamps.

The Edison Electric Illuminating Company, of Brockton, Mass., has organized with a capital of $100,000.

Reading, Pa., has awarded a contract to put forty electric lights in the principal streets to the Reading Electric Light Company.

Swan's incandescent lamps have been applied to lighting the General Infirmary at Vienna. Two wards, operating room and medical instruction room are now illuminated by them. In the wards a portable lamp is used, as well as fixed lights, for cases where lights need to be brought near patients.

A resolution was introduced into the Board of Aldermen, the 20th inst., authorizing the New York and Brooklyn Electric Light Company of New York to lay suitable wires, necessary poles, pipes or other fixtures in, or over and under the streets of the city of New York.

A jury in the Supreme Court decided, the 21st inst., that poles erected by the Metropolitan Telegraph and Telephone Company in certain streets of this city are nuisances. The jury found that the poles were larger than necessary, and incommoded the public in its use of the street. On this verdict, says the *Times*, a motion was heard by Judge Barrett, on Monday, for a decree directing the defendant corporation to remove the objectionable poles, and restraining it from replacing them with similar obstructions.

The cost of electric light in workshops was discussed recently by the Institution of Engineers and Ship-builders in Scotland. A. C. Kirk, of R Napier & Sons, stated that for twelve Brush arc lamps burning three hours per day, the cost of each lamp was 5*s.* 7*d.* per week; 1*s.* 6*d.* was allowed for cost of maintenance, and half a man's wages, 15*s.* per week, for attendance; cost of carbons 8*s.* 6*d.*, allowing for depreciation of the Brush machine, the total cost was £2, 1*s.* 9*d.* ($10.10), or 3*s.* 7*d.* per lamp (84 cents). If the lamps burned 49 hours per week, the cost was 6*s.* per lamp per week ($1.40). Mr. Dick, of the Newton Steel Works, which had 14 or 15 Brush lamps, reckoned the net saving for six months at £19 1*s.* 6*d.* ($93), and he thought the use of the electric lamps had increased the amount of work turned out.

Meter-ites.

An agent has arrived in this country with two of the Grimstow regenerative gas burners, 10 and 25 feet capacity respectively, and is making an effort to bring them to the notice of American engineers. This burner was described in our issue for September 28, 1882.

The Philadelphia Board of Health has received a complaint that a nuisance is created by pumping the refuse from the gas mains out on to the street.

The Judiciary Committee of the Senate of New York have reported favorably an amendment to the law of June 16, 1879, giving to gas light companies the privelege of

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using electricity. The *Tribune* states that the gas companies disclaimed to one of its reporters any interest in the measure. The Treasurer of the New York Gas Light Company thought the bill had been introduced in the interest of the gas companies in the smaller places where apprehension is felt about the rivalry of the electric light.

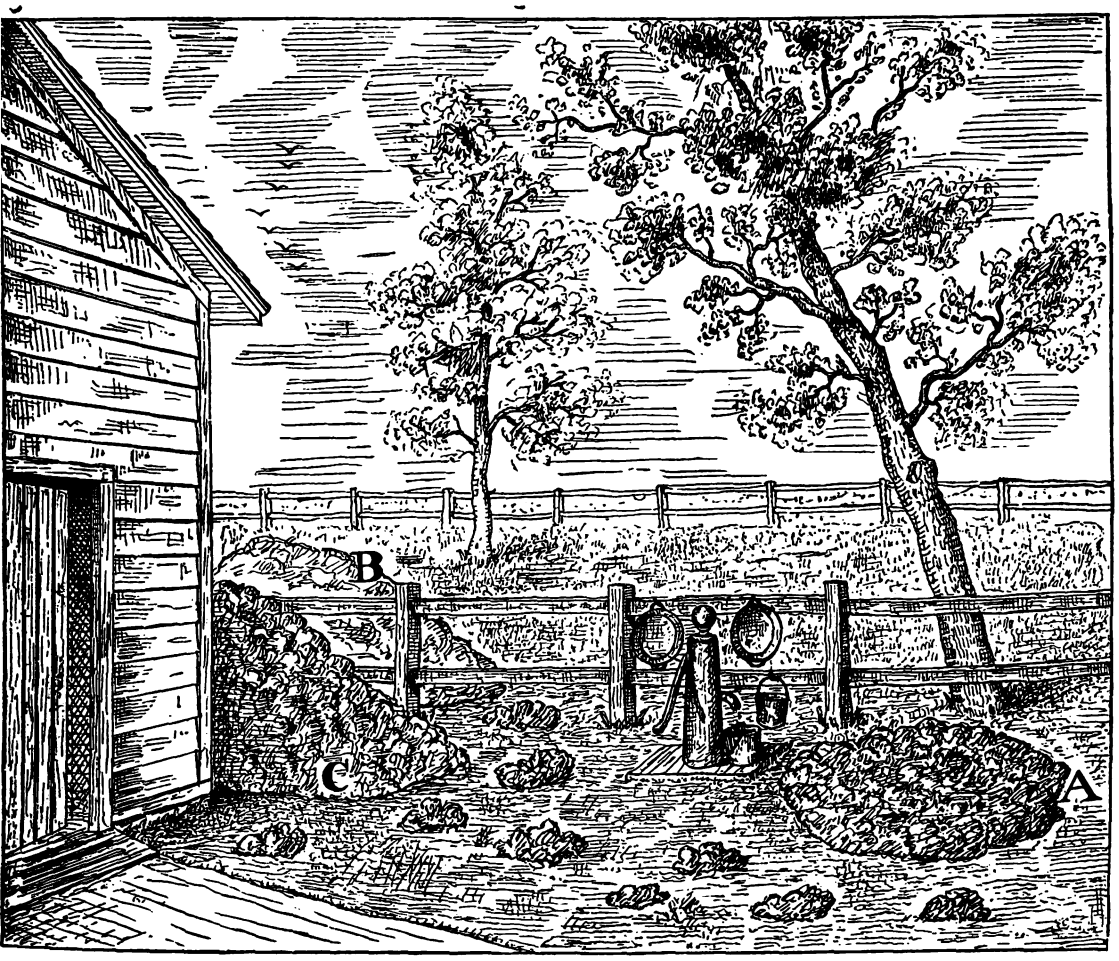
Electrician states that up to the beginning of February 19,536 Edison lamps were in use in Europe; up to December 20, 1882, 29,192 were in use in the United States.

Food and Drugs.

ONE MILK FARM NEAR NEW YORK.

To the Editor of THE SANITARY ENGINEER:

The present stir about the milk supply of New York City reminds me of a sketch of the surroundings of a small milk farm in Morrisania made while strolling in that region some months ago. The sketch is, as near as I could make it, a literal reproduction of the filthy scene. The pump at the centre of the sketch was depended on for the drinking water, and for washing the pans. Not ten feet from this



pump was a sodden slough, *A*, of animal refuse of all kinds, *B* and *C* were manure piles from 30 to 50 feet distance at a rough estimate, while the ground around the pump was liberally sprinkled with manure. From questions I asked and replies given, it was apparent that no suspicion of pollution of the water had crossed the minds of the persons who ran this milk farm, though it was impossible that every rain should not wash the contents of the slough right into the well. B.

A bill was reported from committee in the Massachusetts Legislature, March 14, against the adulteration of milk, butter, cheese and other articles. It provides for the appointment of an inspector by every municipality with over 2,000 inhabitants.

A correspondent states in the London *Lancet*, that an agitation is on foot in Germany having for its object the suppression or limitation of the use of analine dyes in the manufacture of articles of clothing. These dyes have been found to be highly prejudicial and even dangerous in some recent remarkable instances, and a strong feeling in opposition to their use has been set up in certain quarters, which is likely to take the form of Parliamentary action.

THE AMERICAN GROCER.

The following will appear in the *American Grocer* of this week.

OFF FOR HOME.

After thirteen years of faithful service with the *American Grocer*, the last seven years of which were passed as its editor and publisher, Mr. W. T. Jones voluntarily resigns his position to make his home in England. He goes possessed of fame and fortune, the well-merited reward of his push, pluck, energy and thorough knowledge of how to make a successful newspaper. He made of an unprofitable journal, of narrow influence, the representative newspaper of its class, and obtained for it an international reputation. He took it when its income barely met its expenses, and leaves its one of the most valuable newspaper properties in the United States. His success is due to his quick perception of what was for the "best interests of the retail merchants," and the quickness and certainty with which his plans were executed. No amount of criticism, abuse, or ridicule had the slightest influence in changing his purpose to do what he believed to be for the best interests of the *American Grocer*. It was the persistent energy and economy of the man when he was foreman of the composing-room that won the admiration of the stockholders and caused them to place the paper in his charge. The savings from his modest salary as printer enabled him to make small investments in the stock of the *American Grocer* Publishing Association, and as the revenues of the paper grew his holdings of its stock increased to such an extent that he is now able to retire with an ample competency. As an editor, Mr. Jones excelled. His judgment as to the drift of opinion in trade matters was unerring. He divined the wants of his subscribers and met them. We know that the good wishes of advertisers and subscribers, together with those of the stock-holders and his associates in the management of the paper, will follow him to his old home, with the hope that he may there enjoy length of days, blessed with health, happiness and continued prosperity.

Mr. Charles Granville, for the past twelve years associate editor, also resigns his position, in order to return to England. It is with deep regret that the *American Grocer* parts with one so closely identified with its history, and who has done so much to make its pages bright, spicy, instructive and entertaining. Possessed of qualifications of a high order, he worked steadily and with enthusiasm to keep the *American Grocer* at the head. His long and honorable service upon the paper brought him more in personal contact with its readers than any other member of the editorial staff. We but re-echo the sentiment of thousands of merchants all over the country, and of his friends in this city, in wishing him a safe voyage, joy in reunion with long separated parents and friends, with added years of health in which to employ his gifted powers for the good of others, and finding therein an ample reward for himself.

Mr. Frank N. Barrett, for the past seven years the commercial editor, assumes the responsibilities and duties of Editor in Chief. He assumes the more honorable position with a determination to use his own powers, and those of the best available talent, to make the *American Grocer* a paper that is a necessity to those identified with the constituency it serves, and the best of its kind in the world. His power to do that will best be made manifest in future issues of this paper, and the quicker accomplished if he is accorded the same measure of good will and assistance that has been so generously bestowed upon his predecessor.

Mr. E. N. Root, for many years actively connected with the business interests of the paper, becomes publisher. Prior to his connection with the *American Grocer* he was for eleven years associated with the publisher of one of our leading weeklies, and his eighteen years of experience peculiarly adapts him for his new and more responsible position.

It affords us pleasure to acknowledge our indebtedness to Mr. Jones for much valuable advice and assistance at the inception of this journal; indeed THE SANITARY ENGINEER is under obligations to the *American Grocer* for many words of encouragement and for earnest support in all its efforts to secure legislation to prevent the adulteration of food and drugs and the repression of other abuses.

Mr. Jones as the retiring editor and Mr. Barrett as his successor have both our very best wishes, and we believe that under the new management the *American Grocer* will continue to be the leading paper of its class in this country, and exert the influence that an honest, fearless and out-spoken journal is sure to possess.

NOTES.

Dr. James G. Hunt has been reappointed Health Officer of Utica, N. Y.

Mr. Henry M. Wightman has been re-elected City Engineer of Boston receiving 56 of the 59 votes cast in Common Council.

Foreign exchanges mention the death of Mr. George Wythes, of Bickley Hall, Kent, He was engaged in railway contracts with the late Mr. Brassey and other men equally known to fame in the world of engineers. One of his efforts was the construction of a portion of the Great Indian Peninsular Railway.

The Public Health Committee of the Massachusetts Legislature have before them a bill to prevent the transportation by any railrord, or other common carrier, of the remains of any person who has died of small-pox, scarlet fever, diphtheria or typhoid fever.

The Maine Central is trying a new system of heating its cars by steam from the locomotive.

A story is going the rounds that a sewer workman has received $50,000 from the Directors of the Bank of England for revealing to them the fact that it was possible to enter the bullion room of the bank through a sewer connection, of which they were entirely ignorant. The workman astonished the directors by appearing in their midst according to appointment, while they were meeting at midnight to see him fill his promise that he could enter the bank by a means unknown to them. So goes the story.

The officers of the new Board of Health of Westfield, Staten Island, are H. R. Tetman, President, S. Webb Hopping, Secretary, and Dr. George C. Hubbard, Health Officer.

The New Haven, Ct., sanitary inspectors have begun the early spring examinations, and find much filth that should be removed immediately.

A sanitary convention will be held at Reed City, Mich., April 26 and 27, under the auspices of the Michigan State Board of Health.

CHOLERA IN TEHUANTEPEC.

We have received from the National Board of Health a copy of a communication received by it from J. A. Sutter, U. S. Consul at Acapulco, Mexico, relative to an outbreak of cholera in Tehuantepec, which we condense as follows:

"This disease first appeared in Tehuantepec on the 13th of December, 1882, and steadily increased during the following fortnight, the number of deaths daily being 50 to 100. In January the epidemic diminished, but had not entirely disappeared until the middle of the month. The disease usually lasted from two to three days, but in some cases proved fatal within from four to eight hours, presenting all the symptoms of genuine Asiatic cholera. There was but one physician in Tehuantepec at the time, and he fell a victim to the disease, so that no professional observations on the cases are available. The total number of deaths is estimated as being from thirteen to fourteen hundred, out of a population of about 15,000. The same disease prevailed in the surrounding villages, but nothing is known as to the number of cases or deaths."

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ST. JOHN, N. B., WATER SUPPLY.

Mr. Gilbert Murdoch, M. Am. Soc. C. E,, the Superintendent of the Water and Sewerage Works of St. John and Portland, N. B., has made a thorough and interesting report on the water supply of these cities in compliance with an order of the Water and Sewer Commissioners. A sketch of the history of the former and present water works for supplying water is first given, from which it appears that in 1836 a private company constructed works taking their supply from Lily lake about 80 feet above tide water. The water was pumped into a badly constructed reservoir, and was found, after all, to be of poor quality and insufficient quantity. In 1850–1 the supply had been intermittent for several years, water being turned on for only two hours a day, and new works were constructed taking the supply from Little river, 160 feet above the city base of levels, but only ten feet above the highest parts of the city.

The city purchased the works in 1855, and has since laid additional supply mains, so that at present there are three pipes, one of 12-inch, and two of 24-inch, between the reservoir and the city.

The consumption is great, however, and the supply inadequate on the higher levels of the city. This is particularly the case during cold weather, owing to excessive waste in the lower part of the city caused by leaving faucets open to prevent pipes from freezing. In Jan. 1882 some inspections made showed that twenty consumers were wasting an average of 4.458 U.S. gallons each per day, and that 154 reported at the same time were wasting 3,644 gallons each per day. Mr. Murdoch says in this connection, "Inspections and penalties may palliate the injurious effects of this waste, but they are quite inadequate for its total suppression. They have failed everywhere to meet the difficulty, and one of two causes is now generally recognized as the true way to remedy this evil (1), the general application of meters, or (2), to accept this winter consumption as a necessity of our climate and provide for it accordingly. The last-named course is most consistent with advanced thought on the hygienic value of copious supplies of wholesome water, and is likely to become the more popular of the two when water can be had in abundance at a reasonable outlay."

Without endorsing Mr. Murdoch's opinions as to the hygienic advantages of wastefulness in the consumption of water, it may be said that the facts which he has collated in his report, relative to the steady decrease of pressure in the mains as the consumption increases, and the imperative necessity shown to exist for a greater and better regulated supply, are most interesting and well presented.

Dividing the city into four districts arranged topographically, he shows from the records that between the planes of 120 and 160 feet below the reservoir the average loss of effective head during the last six years has been 14.34 feet and in the three belts of 40 feet height each above the first, the loss has been respectively 12.52 ft., 12 ft. and 8.5 ft.

The actual difference between the static head and the head found in the mains, ranges from 39 feet on the lower levels to 22 feet on the higher, sufficient, it is plain, to inconvenience the whole city and seriously incommode the higher portions.

To remedy this evil, Mr. Murdoch proposes to extend the supply mains to one of a series of lakes on the head waters of Little river, and about 275 feet above the city datum, and connect the same with Loch Lomond, a fine sheet of excellent water and large drainage area on the head waters of Mispech river. The city would be divided into two belts of high and low service, for distribution purposes, the present Little river reservoir supplying the low, and the new proposed reservoir, the high service. The estimated cost of bringing in an additional supply of 10,000,000 gallons daily, is estimated at about $250,000. The report is accompanied by a fine map, and is altogether a document most creditable to the author.

Construction Notes.

ROANOKE, VA.—A report has been presented to the City Council, by D. W. Flickwir, and J. H. Skinker, City Engineer, recommending the system of sewerage proposed by Mr. Rudolph Hering, with some modifications. The cost is estimated at $29,262.50.

DENISON, TEXAS.—The Denison Water Supply Company has been granted a franchise to lay pipes in the streets for furnishing water for domestic and fire purposes.

FORT WORTH, TEXAS.—M. S. Hall has been awarded the contract for sewering the city, for $22,450.

BOSTON, MASS.—The Water Board have awarded the contract for cast iron water pipe for the Cochituate Department to D. D. Wood & Co., of Philadelphia. A. H. Micheal, of Burlington, N. J., received the contract for pipe for extension of 48-inch main.

BROOKLYN.—The following bids for a new 36-inch force main, to connect the fourth engine at the Ridgewood pumping station with the distributing reservoir, were opened on the 19th inst., by the Commissioner of City Works:

Thomas McCann	$ 5,985 co
Freel & McNamee	7.502.co
Thomas Newman	7,844.10
M. J. Dady	7,943.10
D. H. Valentine	8,694.60
Seth L. Keeney	12,956.00
Benj. F. Stephens	14,815.15

BROOKLYN.—We take the following particulars about the proposed water main for the Eastern District from the Brooklyn *Eagle*: For 18,300 feet of the route selected, the main will be 36-inch pipe; for 3,700 feet, 30-inch, and for 7,634 feet, 20-inch. The total cost of the main will not be much short of $250,000, the cost of laying the pipe alone being estimated at $50,000. Purveyor Milne is preparing specifications for the whole work, and the Commissioners will advertise for proposals next week.

ALBANY, N. Y.—The Aldermen have adopted a resolution that a special committee of five be appointed by the president of the board, to whom shall be referred the matter of the water supply, and the recommendations of the water commissioners, as contained in their reports of 1881 and 1882, to report to the Aldermen. Also, that the committee on application to the Legislature apply for the passage of a law authorizing the City of Albany to issue Albany city water bonds to the amount of $150,000, for the purpose of cleaning out the reservoirs, building a new reservoir (if necessary), or increasing the storage capacity of the present reservoirs.

NASHVILLE, TENN.—The City Council have before them the question of the ratification of the contract with the Holly Manufacturing Company to furnish three 5,000,000 gallon engines, as made by the Water Works Commission.

ROCHESTER, N. Y.—Until April 6, proposals will be received for a wrought iron bridge over the Genesee River, on Atwater street, by the Executive Board, at the City Hall.

CHICAGO.—The Council Committee recommend for passage an ordinance authorizing the Merchants' Union Telegraph Company to lay underground wires in the streets and alleys. The committee have also placed on file ordinances authorizing the Western Electric Company to lay underground wires, and the Mutual Union Telegraph Co. to erect and maintain aerial cables in the streets.

The Council Committee approves an appropriation of $509 874 93 for public works this year, including $22,000 for Chicago harbor and $55,000 for canal pumping works.

SAN FRANCISCO, *March* 22.—Mayor Bartlett has signed the water ordinance passed last week by the Board of Supervisors, which fixes the rates for the city at about 25 per cent. lower than at present.

SAN JOSE, CAL.—The Manzanita Water Company has been incorporated at San Jose, to furnish water in Santa Clara and San Mateo counties and to the city of San Francisco. The capital stock of the company is $1,000,000, divided into 10,000 shares, and it is understood that the water supply will be taken from the Tuolumne River. —*Engineering News.*

ALBANY, N. Y.—At a meeting of special committeee of the Common Council, March 22, sub-committees on water supply, and on distributing mains, etc., were appointed. It has been recommended that an analysis of the city water be made.

The *Chicago Times* says that petitions are circulating for the sewerage of the whole of Woodlawn.

The Montreal Board of Works give farmers the street sweepings if they will cart them away.

A report by Colonel J. J. Daniel, of the Board of Sanitary Trustees, to the Jacksonville, Fla., Council, recommends the appropriation of $50,000 to do the work required in securing a supply of water.

Philadelphia City Council passed an ordinance the 15th inst., appropriating $210,000 for extension of water works.

Mr. Harry Oldrich read on March 5, before the Society of Engineers, London, a description of works erected by Baron de Podewils for disposing of the sewage of Augsburg, in Bavaria. The matter is deposited in air-tight tanks the gases from which are drawn into the draft of a furnace and consumed. It is then drawn to a mixer where sulphuric acid is added, thence to a fumigating pan, thence to a series of ore evaporators, thence to a drying machine and thence to a disintegrator, coming out as a powder "as good as imported guano."

The works are capable of disposing of the excrement of 17,000 people. It is collected in pails and not through sewers. The system has been in operation three years and the works pay 20 per cent. dividends. The manure is sold at $45 to $50 per ton.

The City Council of New Orleans have passed an ordinance, making it unlawful for any person to use water from wells, canals or gutters, for drinking or for making bread, or for making anything else which is to be eaten or drunk, or for washing pots, pans, dishes or other vessels in which food or drink is to be placed.

It is made the duty of each and every owner of a building or premises, whether he occupies it himself or rents it to others, to provide and furnish said premises with an adequate supply of water for all purposes by either connecting the same with the water works or by providing cistern capacity equal to 200 gallons for each habitable room.

The water works of the town of Lake, Ill., supply now 3,211 houses, and the receipts from water rents in 1882 were $49.200.99. The daily consumption was 3,317,636 gallons or 1,033 gallons per service.

There are 55 miles of water pipe and twelve miles of sewers.

Since 1856 the several boards of works controlling the city of London have constructed 919 miles of sewers, paved 11,745,875 square yards of streets and erected 26,444 new street lamps. There were in 1856, 925 miles of streets, and in 1881, 1,607 miles in the metropolis. On these improvements $57,000,000 have been expended in 25 years.

When Ridgewood reservoir in Brooklyn was built in 1857, there were several cemeteries in the vicinity. The main pipe line to the city passed through Evergreen Cemetery, greatly to the disgust of some citizens who were afraid the water would be contaminated thereby. A law was passed in 1868 forbidding interments within half a mile of the reservoir. It is reported that a new Jewish cemetery has been laid out below the reservoir and certain citizens are afraid that it will injure the water.

AWARD OF GOVERNMENT CONTRACTS.

Custom House, Memphis, Tenn. Synopsis of bids opened March 22, 1883, for sheet copper, circular letters, of March 12, 19, and 20, 1883:

	24-inch and 48-inch. 12 *oz. per lb.*	14 *oz. per lb.*
Park Scott & Co	31½ cts.	29 cts.
C. G. Hussey & Co	29	27½
Haywood & Hutchinson	35 7-100	31 18-100
Bomben Co. & Brass Co	30½	28¼
John Farquhar & Sons	36	34
Ansonia Brass & Copper Co	32	30

Court House and Post Office, Topeka, Kansas. Synopsis of bids opend March 17, 1883, for plastering; advertisement of Feb. 17, 1883:

Robert Halahan	$10.583.co
Joseph Eastman	5,923.·0
D. W. Lloyd	5,500.00
Smith & Crimp	5,569.00

Court House and Post Office, Paducah, Kentucky. Synopsis of bids opened March 20, 1883, for post office screen and wood stairway; advertisement of March 6, 1883:

Paducah Lumber Co	$2,425.00
Joseph Thomas & Co	3,270.00

Court House and Post Office, St. Louis, Mo. Synopsis of bids opened March 22, 1883, for marble wainscot and mantles; advertisement of March 6, 1883:

Burlington Mf'g Co., Chicago	$ 9,395.00
Chas. E. Hall & Co	13,419.00
Rickle Stone Marble Co	9,3·0.00
R. H. Olmsby	7,387.00
Emile Fritsch	10,985.00 / 11,919.00
A. Klaber	17,537.00
Davidson & Sons	8,890.00

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New Pension Building. Bids for bar iron ties were opened March 20, in the office of the Supervising Architect of that building. Twelve bids for furnishing about 0 tons of rolled wrought iron bars, 41, 16 and 1 foot long, or ties and anchors for walls of new Pension Office, as follows:

Bidders.	Place of Delivery	Price per pound. 41 ft. Bars.	16 ft. Bars.	1 ft. Anchors	Remarks.
		Cents.	Cents.	Cents.	
J. F. Bailey, Philadelphia	Washington	2.3	2.3	2.3	Tensile strength
		2.5	2.5	2.5	45,000 lbs, sq. in.
Albany & Rens. Steel and Iron Co., Troy, N. Y.	N. Y. City.	2.9	2.9	2.7	48,000 " "
Jas. Rowland & Co., Philadelphia	Washington	2.8	2.7	2.7	* * *
Allentown Rolling Mills, Philadelphia	"	2.5	2.5	2.5	* * *
Tredegar Iron Works, Richmond, Va.	"	2¾	2¾	2¾	* * *
Phœnix Iron Co., Philadelphia	"	2.7	2.7	2.7	* * *
Morris Wheeler & Co., Philadelphia	"	2¾	2¾	2¾	* * *
Pencoyd Iron Works	"	2.73	2.73	2.73	* * *
N. J. Steel & Iron Co., Trenton, N. J.	"	2⅝	2⅝	2⅝	* * *
James McGill, Washington	"	2.37	2.37	2.37	* * *
C. A. Schneider's Sons, Washington	"	2 9-20	2 9-20	2 9-20	* * *
J. B. Kendall, Washington	"	2.39	2.39	2.39	* * *

* All this is to have tensile strength of 22 tons to the square inch. 49,280 lbs.

The lowest bidders for cut stone for the new Pension Building were Taylor & Lowe, $1.565.00 for sand stone; Middleton, Leme & Co., $1,949.00 for Granite. No award as yet.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

A regular meeting of the Society of Civil Engineers was held on the evening of March 21. Vice-Pres. Wm. H. Paine in the chair. The secretary announced the death of James O. Morse, one of the oldest members of the society. The Secretary, Mr. Bogert, spoke briefly of the deceased in terms of praise and a resolution authorizing the chair to appoint a committee to prepare a memoir was unanimously adopted.

A report was made by Mr. Chanute of the efforts of the Society to get the last Congress to appropriate money for the making of systematic tests of structural material. A sum of $123,000 was asked for to be expended as follows: For the care and operation of the government testing machine at the Watertown arsenal, $10,000; for the purchase of material, $13,000; for the construction of a machine for torsional tests, $50,000, and for a machine for transverse tests, $50,000. The bill appropriating these amounts failed to pass, but the first item was secured by inserting it in the army appropriation bill, which contained a clause directing the Chief of Ordinance to give attention to the requests of the Society for special tests. A programme prepared by the Society has been approved by the Chief of Ordinance and with his coöperation good results are looked for, notwithstanding the failure to obtain the desired appropriation. Manufacturers are expected to furnish material and the freight will be paid by the Ordinance Department. Records of such tests will be furnished the Society and published at their expense.

BOOKS RECEIVED.

ELEVENTH ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD, 1881–1882. Supplement containing the Report of the Medical Officer for 1881. London: George Eyre and William Spottiswoode.

TRANSACTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS. Transactions, Vol. XII. Proceedings, Vol. IX.

EXAMINATION OF MEDICAL CHEMICALS. Frederick Hoffman, M.D., Ph.D., and Frederick B. Power, Ph. D., Philadelphia: Henry C. Lea. 1883.

REPORT OF THE STANDING COMMITTEE ON QUARANTINE, EXTERNAL AND INTERNAL. By William M. Smith, M.D., Chairman of the Standing Committee on Quarantine.

MICROBES IN FERMENTATION, PUTREFACTION AND DISEASE. By Charles Cameron, M.D., LL.D., M.P., London: Baillière, Tindall & Cox. Paper, one shilling.

REPORTS OF HER MAJESTY'S DIPLOMATIC AND CONSULAR OFFICERS ABROAD, 1882.

SPECIAL REPORT ON THE WATER SUPPLY OF ST. JOHN, N. B., AND TOWN OF PORTLAND. By Gilbert Murdoch, C. E.

REMARKS OF WILLIAM J. McALPINE, C. E., BEFORE THE MAYOR AND COMMISSION ON THE PROJECT FOR AN INCREASED SUPPLY.

PROCEEDINGS OF THE NEW YORK BOARD OF TRADE AND TRANSPORTATION, 1883.

BUFFALO TRUNK SEWER. Specifications for furnishing Sewer Brick, etc. Issued by the Board of Sewer Commisssioners.

JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, Vol. V. No. 1, New York.

REPORT OF THE BOARD OF SEWER COMMISSIONERS AND GEORGE E. WARING, Jr., Expert Engineer on the Intercepting Sewer, made to the Common Council of the City of Buffalo. Sept. 18, 1882.

EXCERPT MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS: The Capacity of Storage Reservoirs for Water Supply. By W. Rippl, Docent at the Royal Technical High School at Gratz, Styria; The River Indus as a Source of Supply for Irrigation Canals in Sind. By Charles Swaine Fahey, M. Inst., C. E.; Modern Corn Milling. By Professor Cesare Saldini, of Milan; On the Horizontal Thrust of a Mass of Sand. By George Howard Darwin, M. A., F. R. S.; Various Methods of Determining Dimensions. By Dr. James Weyrauch, Professor at the Polytechnic of Stuttgart.

BUFFALO TRUNK SEWER. DESCRIPTION, DETAILED SPECIFICATIONS AND CONDITIONS OF LETTING THE WORK. Prepared by the order of the Board of Sewer Commissioners. By George E. Waring, Consulting Engineer.

THE SELECT COMMITTEE OF THE HOUSE OF COMMONS, ON THE CONTAGIOUS DISEASES ACTS (1866–1869). Sessions of 1879 to 1882. The Minority report. London: Frederick C. Banks. Paper, 6 pence.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Bowery, No. 317, one br and Wyoming st trimmed store; cost $15,000; o, Herman Bruns; a, F. W. Kiemt....Henry st, No. 75, near Market st, one br store; cost $12,000; o, James Shea; a, Fred. Jenth. ....Pitt st, No. 64, rear, one br stable; cost $1,500; o, Conrad Waldeck, a, W. Graul....23d st, No. 55 W., extending to 24th st, one cut sand stone museum and winter garden; cost $150,000; o, Eden Musee Grevin Americain, Theo. Hellman, President; a, Henry Fernbach....40th st, No. 424 W., one br tenem't; cost $16,000; o, Henry P. Niebuhr; a, G. W. Da Cunha....40th st, No. 314 E., one tenem't; cost $15,000; o, Joseph and Robert Gordon; a, Albert Wagner....52d st, Nos. 416 and 448 W., one br factory; cost $20,000; o, Travers Bros., by V. P. Travers; a, Geo, W. Hughes....Madison av, n w cor 60th st, one br and b s dwel; cost $80,000; o, C. A. Dana; a and b, Chas. Buek & Co....Madison av, w s, 73 n 60th st, three b and b s dwels; cost $27,000, $25,000 and $30,000; o, a and b, Chas. Buek & Co.... 69th st, n s, 240 e 3d av, four b and b s flats; cost $20,000 ea; o, Andrew Kelly; a, G. A. Schellenger....71st st, n s, 75 e 2d av, ten b s apart houses; cost $15,000 ea; o, Jacob L. Maschke: a, J. C. Burne....77th st; s s, 230 w 2d av, two Connecticut b s apart houses; cost 20,000, ea; o, Samuel Simmons; a, C. Baxter....92d st, n s, 150 e 4th av, three Connecticut b s apart houses; cost $30,000, ea; o, Morris Keller; a, Chas. Baxter ...93d st, s s, 150 e 4th av, two Connecticut b s apart houses; cost $20,000, ea; o and a, same as last....1st av, No. 1500, one b s tenem't; cost $16,000; o, Mrs. Eva Muller; a and b, Karl Peters ....1st av, n e cor 87th st, five br and b s tenem'ts; cost $15,000, ea; o, Jacob Wicks, Jr.; a, John Brandt....80th st, s s, 100 e Madison av, one Connecticut b s dwel; cost $28,000: o, Terence Farley; a, Thom & Wilson ...80th st, s s, 124 e Madison av, seven Connecticut b s dwels; cost $26,000, ea; o and a, same as last ..95th st, n s, 80 w 3d av, one b s tenem't; cost $14,000; o and b, John D. Karst, Jr.; a, W. Graul.. .79th st, s s, 350 w 9th av, five b s dwels; cost $10,000; o, Samuel Colcord; a, H. L. Harris. ..124th st, n s, 200 e 8th av, two b s tenem'ts; cost $12,000, ea; o, Sarah Darragh; a, J. E. Darragh... 125th st, n w cor 2d av, one b s st and tenem't; cost $16,000; o, Samuel Simmons; a, Chas. Baxter...2d av, w s, 75 n 125th st, one Connecticut b s tenem't; cost $16,000; o and a, same as last ...125th st, n s, 18 w 2d av, two b s tenem'ts; cost $18,000 ea; o and a, same as last...125th st, n s, 74 w 2d av, two b s tenem'ts; cost $20,000, ea; o and a, same as last....126th st, n s, 350 e 7th av, three Connecticut b s dwels; cost $19,000 ea; o, Samuel O. Wright; a, Cleverdon & Putzel...9th av, n w cor 153d st, one br dwel; cost $25,000; o, Frederick N. Dubois; a, Cleverdon & Putzel....4th av, n w cor 125th st, one br and b s safety deposit, banking house and dwel; cost about $140,000; o, Mount Morris Safe Deposit Co.; a, Lamb and Rich

ALTERATIONS, NEW YORK CITY.

94th st, No. 160 E., repair damage by fire; cost $3,000; o, H. J. Burchell....8th st No. 56 E., add one story, interior alterations; cost $2,500; o, Geo. Schlereth; a, J. M. Forster....48th st, Nos. 316 and 318 W., bulged wall rebuilt, new timbers, etc.; cost $3,000; o; J. R. Thurber; a, J. M. Dunn....2d av, No. 613, br extension; cost $3,000; o, M. Luttschwager; b, M. Schwartz & Son and M. Schmeckenbecker's Sons....71st st, No. 396 E., br extension; cost $2,500; o, Christian Haak; a, Wm. Bridgwood....Union av, n e cor Boston av, fr extension; cost $140; o, Harfred B. Kuk... Broadway, Nos. 1412 and 1414, to be raised two stories, and interior alterations; cost $30,000; o, John Brower; a, Henry F. Kilburn....1st av, No. 2224, raise building and br extension; cost $2,600; o, Cath. M. Balmore; a and b, Wm. Fernschild & Son....South 5th av, No. 15, br extension; cost $2,000; o, Alex. Loppin; a, W. E. Bishop....5th av, No. 640, Connecticut b s extension for picture gallery; cost $75,000; o, Wm. H. Vanderbilt; a, J. B. Snook....Av A, Nos. 28 and 30, new store front and interior alterations; cost $11,000; o, Moritz; a, H. Kafka.

BROOKLYN.

Lincoln pl, s s, 359 e 7th av, one br and b s dwel; cost $20,000; o, Henry Gaullieur; a, Chas. Werner....Berkeley pl, n s, 250 w 8th av, five b s dwels; cost $12,000, ea; o and a, J. Doherty & Son... Bushwick av, n e cor Ivy st, one br school house; cost $30,000; o, Board of Education; a, J. W. Naughton....Ellery st, s s, 100 e Broadway; one br school house; cost $30,000; o and a, same as last ...Bergen st, s s, abt 200 w 3d av, one br stable; cost $12,000; o, Long Island Brewing Co.; a, M. J. Morrill.

BROOKLYN ALTERATIONS.

Himrod st, n e cor Knickerbocker av, propose to raise building 11 feet, fr story beneath, also fr extension; cost $3.000; o. Louis Weberi a, A. Herbert ...South 4th st, s w cor 5th st, br extension; cost $4,000; o, Dr. Dugon; a, A. Herbert.

BALIMORE, MD.—Rose alley, w s, 1 br bl'd'g; o, Sam'l Ellinger; b, same....Camden st, w s, 9 br bldg; o, Abbott Land Co....Hair st, e s, 27 bldg; o, same ..Fulton st, w s, 8 br bldg; o, L. H. Robinson; b, same .St. Paul st, e s, 1 br bldg; cost $40,000; o, B F. Newcomer; b, J. E. Marshal... Watson st, n s, 3 br bldg; o, John Quinn....Pleasant st, s s, 1 br bldg; o L. W. Hugh; b, same Mulberry st, n s, 5 br bldg; o. Wm. T. Phillips; b, same....Fremont st, s w cor Mulberry, 1 br bldg; o, G. Schroeffer... Lencern st, s e cor Aliceanna, 1 br factory; o. J. Healy....101 Eastern av, s s, 1 br bldg; o, Jos. Barns; b, same... Park av bet Haffman and Daulf, 5 br bldg; o, Chas. D. Blake; b, same....115 Paca st, e s, 1 br bldg; o, Welcom White.

BOSTON, MASS.—185 Commonwealth av, 1 br dwel; o, Wm. L. Bradley: b. Jas. Smith....Hancock st nr Glendale st, 1 fr dwel; o, Edward McKechnie; b, Edward McKechnie....Norfolk st nr Fort Hill av, 1 fr dwel; o, Chas. T. Berry; b. J. H. Haddock....Blue Hill av nr Haywaid st, 2 fr dwel; o, John Tayban; b, C. E. Currier....Lauriat av nr N. Y. & N. E. R. R.; 1 br dwel and shop; Geo. W. Goodale... 232 Border st, 1 fr dwel; o, Henry Weeks; b, Jas. F. Dutton.

CHICAGO, ILL.—Hill nr Franklin st, br dwel; cost $9,000; o, Kee & Chappell; a, Harold Hansen; c, not let....W. Erie nr Elizabeth st, two br stores and flats; cost $10,000; o. John Olsany; a, Hansen; c, not let....W. Ohio and Rocker st. br store and flats; cost $10,000; o, Tobias Samuelson; a, Hansen; c, not let ...N. Clark st, cor Fullerton av, br dwel; cost $7,000; o, L. E. Heckmot; a, Holabird, Simards & Roche; c, L. Weick... 15-17 Dearborn st br st; cost $11,000; o, F. C. Porter....573–575 Blue Island av, br stores and flats; cost $19,000; o, Springfield & Johnson; a, Wolf; c, M. D Brown ...715 Adams st, br dwel; cost $8 000; o, H. W. Barrett; a, M. L. Beers; c, Snow & Alsip....76 O'Brien st, cost $6,000; o, D. F. Bremner; a. Greg. Vigeant; c, D. H. Hayes & A. E. Fortin ...583 LaSalle av, br flat; cost 14,000; o, Chas. Dagling; a, C. O. Hansen; c, C. J. Bergh....48-50 Douglas av, br dwelling; cost $8,000; o and c, O. W. Shedon .. 3,824 State st, br flats; cost $5,500: o, J. A. Raabe; a, W. Blanke; c, Jno. Scheel ....2,725 Prairie st, br dwel; cost $9,000; o, L. W. Pitcher; a, Dixon & Townsend; c, L. Wartinsen .. 213-215 W. 12th st, brick store and dwel; cost $12,000; o, Frank Rasolek; a, R. W. Ruehl; c, W. Horack....403 Hurlbut st, br dwel; cost $5,000; o and c, Fred Mener . 102 Centre av, br dwel; cost $5,500; o, C. W. Turner; a. Hutchinson; c, Galagher....600-608 Division st, brick dwel; cost $60,000; o, Wm. Dickenson: a, T. Traver; c, not let ....250-252 Wells st, br dwel; cost $9,000; o, Philip V. Johnson 827 Twelfth st, br flats; cost $5,000; o. Rudolph Bielfeld; a, a, Boasler; c. A. Dresser.... Washiel, bet 30th and 31st st, five cottages; cost $5,000; o and c, Chas. Farr....22d st by Anderson av, dancing academy; cost some $23,000; o, Prof. Bournigal; a, Burnham & Root; c, not let .. 158-160 W. Wanral st, br add; cost $5,000; o. C. Pope; a, J. J. Flanders; c, not let... 14-18 S. Canal st. br add; cost $10,000; o, Newberry estate; a, F. H. Wadskier; c, J. Mountain.

CINCINNATI, ILL.—Harriet nr Front st, br bldg; cost, $6,500; o. Geo. Kettels; b, Witte & Weber....Cor Riddle and Bank st. br bldg; cost, $25,000; o, G. P. Winchel; b, Henry Behrens .. Calhoun nr Clifton st, br dwel; cost, $13,000; o, O. Peters; b, O. Meineca.... Fourth nr Main st, br bldg; cost, $20,000; o, Spring Grove Cemetery....Dunlap nr Stark st, br dwe.; cost $8,000; o, F. Seidenburg; b, Harig & Bruegerman... 535 & 537 Central ave, br bldg; cost $10,000; o, Wm. Frillman; b, Aulfdembrinke & Co.

DENVER, COL.—Stout st. & 18 st, stone terrace; cost $30.000; o, J. G. Webster; a, F. E. Edbrook & Co.....Lincoln ave, br dwel; cost $15,000; o, Geo. Rust; a, H. H. Halley....Capitol Hill, br dwel; cost $10,000; o, F. G. King; a, Putnam & Block....Broadway, br dwel; cost $6,000; o, Edward Kesterns; a, W. M. Quayle.

DUBUQUE, ILL.—800 Bluff st, improvements to Lorimer House, Hotel water closet and general improvements; cost, $3,000; o, Lorimer House Hotel Co.

EVANGTON, ILL.—Frame dwel; cost $8.000; o, C. M. Goodrich; b, Holabird, Simonds & Roche; a, James Wigginton.

KANSAS CITY.—243 16th st, br dwel; cost $5,000; o, L. Bartlett.

LAKE VIEW, ILL.—Frame depot, c, $7,000; o, Chicago & Evanston R. R; b, Holabird, Simonds & Roche

WASHINGTON, D. C.—14th st, bet Corcoran & R st, 3 br mansard and cellar; cost $19,000; o, John Sherman & Co. a, John Sherman... B st bet 3d & 4th st, 2 br dwel; cost $5,000; o, H. K. Simpson; a, H. K. Simpson....F st, bet 17th & 18th st, br bldg with cellar & mansard roof; cost $7.800; o, M. R. Bigelow; a, Gray & Page; b, Thos. Kinney....20th st bet M & N st, br dwel; cost $5,000; o, C. Henrich; a, C, Didden; b, B. Beha....17 st bet L & M st, 4 br dwel; cost $14,500; o, D. H. Rice; a, D. H. Rice; b, D. H. Rice.

MISCELLANEOUS.

BACK BAY, BOSTON.—The new brown stone Chateau of Oakes Ames Esq, at the corner of Commonwealth avenue and Westchester park will cost $125,000. Carl Tehmer is the architect.

CHICAGO, ILL.—The new structure of the Commercial Safty Deposit Company to be erected on the corner of Monroe and Dearborn streets will cost $200,000. Jaffray & Scott are to be the architects it will be built of brown stone.

RICHMOND, VA.—$300,000 has been appropriated by the council for erecting new city hall.

ROCHESTER, NEW YORK—The Standard Sewer Pipe Company have let contracts for a building on Rowe street, to cost $60,000.

The City Council of New Orleans has appropriated $200,000 for erecting a court house and prison.

TOLEDO.—C. M. Palmer of Chicago has prepared plans for the new Hall Block, frontage on St. Clair street 175 feet, on Jefferson street 120 feet, four stories and basement, pressed brick with stone trimmings.

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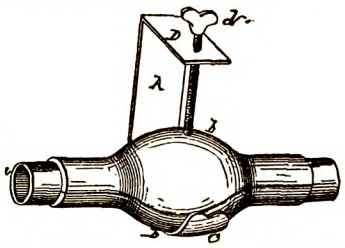
Patents.

[*It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, and Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.*]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

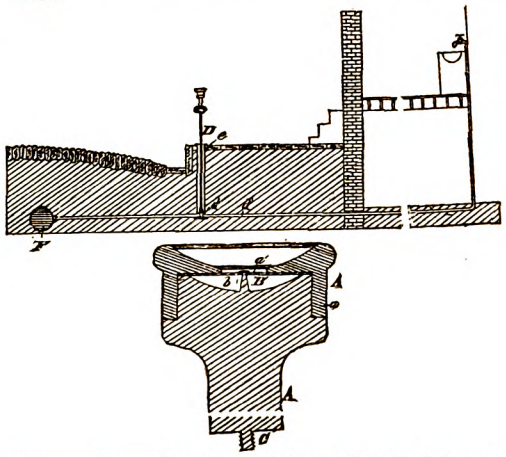
267,800. JOINT WIPER, ROBERT REACH, Washington, D.C. Filed Mar. 30, 1882. (No model.) Issued Nov. 21, 1882.

Brief.—Scrape the ends of the pipe. Apply the forms of solder and sections *b* and clamp them in place. Heat and slightly rotate the clamp to melt and spread the solder.



Claim.—The combination of the sections B B, for reception of solder forms B¹, and clamp A, substantially as shown and for the purpose described.

267,825. METHOD OF AND APPARATUS FOR DETECTING LEAKAGE IN CONDUITS. THOMAS J. BELL, Cincinnati, Ohio. Filed Jan. 3, 1882. (No model.) Issued Nov. 21, 1882.



Claim.—1. The method of ascertaining and locating leaks or improper use of water in service mains and pipes in cities and buildings, consisting in receiving, amplifying and converting the molecular vibrations induced in such pipes by the escaping water, and conveying the same to the ear by means of suitable microphonic apparatus applied to such mains or pipes, substantially as set forth.

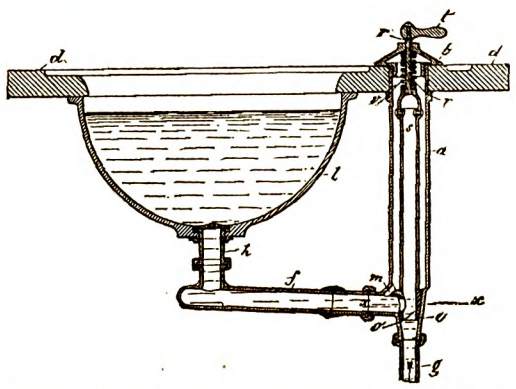
2. The microphonic apparatus consisting essentially of a metallic diaphragm centrally mounted upon a stud or transmitting rod in a sound chamber, and adapted to be applied to water or gas mains for the detection of leaks, substantially as set forth.

3. The herein-described leak detector, consisting of a body-piece, A, provided with a stud, b^1, and lug C, cap-piece A^1, having an opening, a^1, and a diaphragm, B, mounted in the chamber formed by the cap and body-piece, substantially as specified.

4. The combination of the body-piece A, cap A^1, stud B^1, and metal diaphragm, B, placed between the cap and the body, substantially as set forth.

5. An apparatus for transmitting the sounds of leakage in fluid-conduits to the ear of an attendant or inspector, consisting of the microphonic leak-detector A and the key D, the latter adapted to be applied to the cock of the service-pipe, substantially as set forth.

267,863. BASIN COCK AND OVERFLOW, JAMES FOLEY, Brooklyn, N. Y. Filed Sept. 12, 1882. (No model.) Issued Nov. 21, 1882.

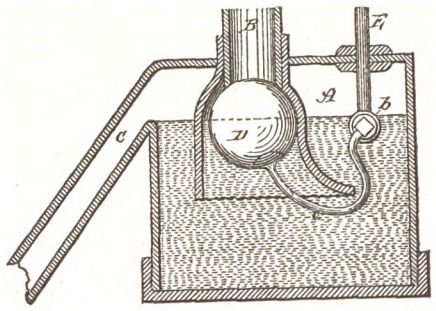


Claim.—The combination, with the stand-pipe, waste-pipe, and lateral connection to the basin or bath, of the cock at the junction of the respective pipes, having a tubular plug, an overflow pipe, which is a continuation of the tubular plug, the stem and handle by means of which the plug is turned, and the cap at the upper end of the stand-pipe, substantially as set forth.

267,973. TRAP. ROBERT CLARK, Brooklyn N. Y. Filed Jan. 25, 1882. Renewed Oct. 11, 1882. (No model.) Issued Nov. 21, 1882.

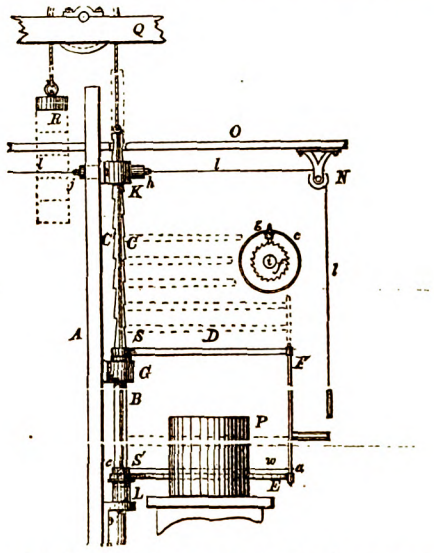
Brief.—To prevent the water sinking below pipe B, by evaporation or other causes, and thus rendering the trap inefficient, a ball float regulating a water supply pipe, E, is placed in said trap and keeps the water up to the required standard.

Claim.—1. A trap provided with a ball, D, within the casing A, and with an inlet water supply pipe and cock connected to the ball, whereby the supply of water in the trap is maintained and the sealing of the trap secured, substantially as set forth.



2. The combination, in a trap, of the case A, containing the ball-valve D, the inlet and outlet pipes B C, water supply-pipe E, and cock *b*, connected to the ball D, substantially as set forth.

267,700. MACHINE FOR CUTTING SEWER PIPE RINGS. ROBERT W. LYLE, Rochester, N. Y., assignor to Otis & Gorsline, same place. Filed Sept. 14 1881. (No model.) Issued Nov. 21, 1882.



Claim.—1. A horizontally vibrating wire carrying frame arranged to swing over a suitable pipe supporting platform, in combination with means, substantially as described, whereby the relative positions of the pipe and frame are changed between each vibration.

2. In combination with a suitable supporting post, A, the swinging frame D F, wire *w*, sliding bar B, rack C, and spring catch *h*, substantially as described.

3. In combination with the swinging wire carrying frame D F, the sliding bar B, provided with two or more racks, C C¹, having teeth of different sizes, and corresponding spring catches *h j*, substantially as described.

276,143. STOVE. DOMINICUS BRIX, Geneseo, Ill. Filed Sept. 9, 1882. (No model.) Issued Nov. 7, 1882.

267,200. AUTOMATIC WATER HEATER. JAMES HAWLEY, Liverpool, England, assignor to Frederick Myers, New York, N. Y. Filed Jan. 20, 1882. (No model.) Issued Nov. 7, 1882.

267,241. STEAM BOILER. EDWARD J. MOORE, Baltimore, Md. Filed April 20, 1882. (No model.) Issued Nov. 7, 1882.

267,256. VENTILATOR. DE GARMO ROBBINS, Rochester, N. Y. Filed March 1, 1882. (No model.) Issued Nov. 7, 1882.

267,334. VAPOR STOVE. ZEBULON DAVIS, Canton, Ohio. Filed July 21, 1882. (No model.) Issued Nov. 14, 1882.

267,343. WIRE TUBING. ANDREW HARBISON, New Castle, Pa., assignor to himself and Wm. C. Harbison, same place. Filed Feb. 27, 1882. (No model.) Issued Nov. 14, 1882.

267,352. HYDRAULIC PRESSURE PUMP. SPENCER KELLOGG and JOHN WELLER, Buffalo, N. Y., assignors to Kellogg & McDougall, same place. Filed July 3, 1882. (No model.) Issued Nov. 14, 1882.

267,362. RADIATING FLUE. FREDERIC B. NICHOLS, Halifax, Nova Scotia, Canada, assignor of one-half to Cathcart Thomson, same place. Filed Feb. 21, 1882. (No model.) Issued Nov. 14, 1882.

267,388. FIRE GRATE. FREDRICK W. WEAVER and DANIEL NORTON, Troy, N. Y. Filed April 24, 1882. (No model.) Issued Nov. 14, 1882.

267,401. PIPE JOINT. DAVID A. BRISLIN, St. Louis, Mo. Filed May 9, 1882. (No model.) Issued Nov. 14, 1882.

267,409. CONDUIT FOR UNDERGROUND LINES. WILLIAM B. ELTONHEAD, Philadelphia, Pa., assignor to Ed. Y. Eltonhead, same place. Filed Dec. 29, 1881. (Model.) Issued Nov. 14, 1882.

267,410. STEAM PUMP. WILLIAM M. FERRY, Park City, Utah. Filed Aug. 2, 1882. (No model.) Issued Nov. 14, 1882.

267,411. PUMP. WILLIAM P. FIELD, Lockport, N. Y. Filed May 27, 1881. (No model.) Issued Nov. 14, 1882.

267,431. HYDROCARBON-GAS BURNER FOR BLAST FURNACES AND OTHER PURPOSES. JOHN HOSKINS, Chicago, Ill. Filed May 28, 1881. (No model.) Issued November 14, 1882.

267,445. MEANS FOR MEASURING ELECTRIC CURRENTS. SAMUEL D. MOTT, New York, N. Y. Filed April 24, 1882. (No model.) Issued November 14, 1882.

267,458 ELECTRICAL IGNITING DEVICE FOR GAS-ENGINES. ALEXANDER K. RIDER, Walden, N. Y. Filed July 20. 1882. (No model). Issued November 14, 1882.

267,461. GATE OR VALVE FOR RESERVOIRS. EMILE ROCHE, Marseilles, France. Filed July 20, 1882. (No model.) Patented in France Feb. 15, 1882, No. 147,405; in Belgium June 10, 1882; in Spain June 12, 1882; England June 15, 1882; in Austria June 17, 1882; in Italy June 17, 1882, and in Germany June 18, 1882. Issued November 14, 1882.

267,466. ATTACHMENT TO BURNER FOR GAS, &c. IRA W. SHALER, Brooklyn, N. Y. Filed April 7, 1882. (No model.) Issued November 14, 1882.

267,468. SPOUT FOR WOODEN PUMPS. BURR C. STEPHENSON, South Bend, Ind. Filed March 20, 1882. (No model.) Issued November 14, 1882.

267,478. PETROLEUM-BURNER. DAVID E. BANGS, Medford, Mass., assignor to the National Heat and Light Company of Maine. Filed June 17, 1882. (No model.) Issued November 14, 1882.

267,479. CHIMNEY-COWL. WINFIELD S. BEEBE, Middletown, Conn. Filed July 18, 1882. (No model.) Issued November 14, 1882.

262,499. GRATE-BASKET. CHARLES F. W. DANKERS, New Orleans, La. Filed May 17, 1882. (No model.) Issued November 14, 1882.

267,511. LAMP-BURNER FOR HEAVY OILS. GEORGE FLOWER, Detroit, Mich. Filed Sept. 5, 1882. (No model.) Issued November 14, 1882.

267,537. STEAM-PACKING. HENRY W. JOHNS, New York, N. Y. Filed June 13, 1882. (Model.) Issued November 14, 1882.

267,605. DRIVING TUBE WELLS. WILLIAM J. SHERMAN, St. Augustine, Fla. Filed May 4, 1882. (No model.) Issued November 14, 1882.

267 612. FAUCET. WILLIAM G. STIENMETZ, Brooklyn, N. Y. Filed Feb. 16, 1882. (No model.) Issued November 14, 1882.

267,626. LAMP. S. LLOYD WIEGAND, Philadelphia, Pa. Filed Dec. 19, 1881. (No model.) Issued November 14, 1882.

267,653. GAS-PUMP. JOHN RING, St. Louis, Mo. Filed Aug. 2, 1882. (No model.) Issued November 14, 1882.

267, 657. VAPOR-BURNER. HENRY S. BELDEN, Canton, Ohio. Filed April 14, 1882. (No model.) Issued November 14, 1882.

267,796. PROCESS OF PREVENTING THE ESCAPE OF GAS FROM OIL WELLS BETWEEN THE FLOWS OF OIL. CHARLES H. MCKEE, Lock Haven, Pa. Filed Sept. 15, 1881. (No model.) Issued Nov. 21, 1882.

267,805. CHIMNEY TOP AND VENTILATOR. EMIL R. STASCH, Corning, N. Y., assignor of one-half to George R. Brown, same place. Filed July 14, 1882. (No model.) Issued Nov. 21, 1882.

267,831. STEAM-TRAP. EMILE BRIART, Jeumont, France. Filed Dec 15, 1881. (Model.) Patented in Belgium Nov. 17, 1880. No. 53,054. Issued Nov. 21, 1882.

267,841. CONSTRUCTION OF ARCHES, Etc. JOHN H. CRUSE, Felicity, Ohio. Filed Mar. 15, 1882. (No model.) Issued Nov. 21, 1882.

267,870. ALARM CATCH BASIN FOR ICE BOXES. HENRY FUHRMANN, Chicago, Ill. Filed July 5, 1882. (No model.) Issued Nov. 21, 1882.

267,883. UNDERGROUND TELEGRAPH LINE. CHRISTIAN H. HANSEN, Washington, D. C. Filed Nov. 29, 1881. (No model.) Issued Nov. 21, 1882.

267,885. FIRE-PLACE. JAMES S. HARDING, Ripley, Ohio. Filed Sept. 2, 1882. (No model.) Issued Nov. 21, 1882.

267,894. PUMP. JOSEPH IMLER, Forest, Ohio. Filed July 14, 1882. (No model.) Issued Nov. 21, 1882.

267,910. GRATE SECTION AND FIRE BED FOR STOVES, FURNACES, Etc. WILLIAM MCCLAVE, Scranton, Pa. Filed Oct. 4, 1882. (No model.) Issued Nov. 21, 1882.

267,918. WELL-AUGER. ERASTUS J. MULKAY, Americus, Ga., assignor of one-half to Allen Fort, same place. Filed June 17, 1882. (No model.) Issued Nov. 21, 1882.

267,933. APPARATUS FOR MANUFACTURING WOOD GAS. GEORGE RAMSDELL, Oswego, N. Y. Filed Oct 14, 1881. (No model.) Issued Nov. 21, 1882.

267,971. APPARATUS FOR BURNING GAS. GEORGE H. BURROWS, Somerville, assignor, by mesne assignments, to himself and E. Gilman Colby, Greenwood, Mass. Filed Apr. 3, 1882. (No model.) Issued Nov. 21, 1882.

267,710. ELECTRIC PUMPING APPARATUS. CHARLES C. PECK and Wm. H. Chapman, Middlebury, Vt. Filed Feb. 17, 1882. (No model.) Issued Nov. 21, 1882.

267,737. GRATE. LEMUEL BANNISTER, Philadelphia, Pa. Filed July 28, 1882. (No model.) Issued Nov. 21, 1882.

267,741. VENTILATOR. MICHAEL H. DORGAN, San Francisco, Cal. Filed June 5, 1882. (No model.) Issued Nov. 21, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MARCH 17th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
North Atlantic Cities.																							
Portland.....Maine	34,519	18	27 0	3	17.2	1		5								2					1		
Boston.....Mass.	407,581	193	24.4	41	21.2	7	1	31	2	6	4	3	1		1	35		9	1	4	4		
*Cambridge.....Mass																							
Worcester.....Mass.	64,995	27	21 3	6	22.2	2		2	1		1	1				5	1	1					
New Haven.....Conn.	66,979	24	18.2	11	45.8	1		3	1							3		1		2	1		3
Providence.....R. I.	116,755	49	21 3	14	28.5	1		8		1	2					7		2			1		1
Total	692,829	311	23 4	75	24.1	12	1	49	4	7	7	4	1		1	52	1	13	1	6	7		4
Eastern Cities.																							
Albany.....New York	98,430	51	26.5	23	45.0			8	3	1			2		1	2	1	1	2		1		
New York.....New York	1,299,249	739	29.1	272	36.8	18	4	127	16	11	23	7	5	9	28	118		35		21	15	1	11
Brooklyn.....New York	613,763	281	22 9	95	33.8			40	7	2	12	4	1	6	17	41	1	12	1		3		7
Hudson Co.....New Jersey	220,025	109	25.5	40	36 6	8	1	12	4	2	6	2	1	1	5	12		5					
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	20	19.2					3	1	1			2			2		1					
Paterson.....New Jersey	58,324	22	19 2	6	27.2			3							1	7		1					
Philadelphia.....Pa.	907,043	400	22.9	106	26.5	3		63	17		20	2	11	1	2	33	9	8		1		4	2
*Reading.....Pa.																							
Wilmington.....Delaware	46,885	31	34.3	11	35.4		2	3	2	1			1	1	1	2	2					3	
Total	3,317,735	1,653	25.5	553	33.4	29	7	259	50	18	61	15	23	18	54	217	13	63	3	22	19	8	20
Lake Cities.																							
Buffalo.....New York	168,702	51	15.6	23	45.0			4	2	1	2		3		4	3	2					1	
Rochester.....New York	92,116	33	18.2	8	24.2	1		5			2		1			2		1					
*Syracuse.....New York																							
Cleveland.....Ohio	192,084	58	15.6			2		2	1		5		3		1	7	3	1			1		1
Detroit.....Michigan	131,118	65	25 5	33	50.7		1	6			4	1			4	5		3					1
Chicago.....Illinois	597,834	190	16 1	88	46 3	12	1	14	4	2	12	4	4		5	18	2	5		1	4		3
Milwaukee.....Wisconsin	135,233	49	18.7	23	46.5	2		5	1		2				1	3		1	1		4		1
Total	1,317,087	446	17.1	175	39 0	17	2	36	8	3	27	5	11		15	38	7	11	1	1	9	1	6
River Cities.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa	191,523	69	18.7	21	30.4	10	1	7			5		5		2	5	1	3				1	3
Cincinnati.....Ohio	267,767	155	29.6	62	40.0	4	1	30	3	2	2	2	3	2	11	20	1	9			1		7
Dayton.....Ohio	41,648	13	16.1	5	38.4		1	3															
*Louisville.....Ky																							
Indianapolis.....Indiana	86,529	29	17.1	11	37.9			2		1	1			2		4	1	3					
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	25	13 0	7	28.0	2		1	2		2	1	1		1	2					1	1	
*St. Paul.....Minn																							
St Louis.....Mo.	362,826	137	19 2	57	41.6	3	6	21	4	1	5	1	6	2	7	13		5		1			
Total	1,048,309	428	20 8	163	38.0	19	9	64	9	4	15	4	15	6	21	44	3	20		1	2	2	10
Pacific Cities.																							
*San Francisco.....Cal																							
Southern Cities.																							
District of Columbia.. " "	Wh.	136,471	52	38.0	9	17.3		13			2		1	2	4	4	1	2					
	Col.	71,103	51	19 2	21	41.1		8		2			1	1	2	8		3	1		1		
Richmond, " " Va.	Wh.	38,526	15	19 7	7	46 6		2															1
	Col.	29,394	18	31 7	7	38.8	3	4								2		1					
Charleston " " S. C.	Wh.	22,699	8	18.7	1	12.4		2															
	Col.	27,595	14	26 0	4	28.5		4															
Atlanta " " Ga.	Wh.	25,583	8	16.1	1	12 5		2								2					1		
	Col.	19,221	10	27.0	2	20 0		3		2						1							
Savannah " " Ga.	Wh.	15,041	12	41.1			1	2		1						2							
	Col.	16,506	12	37.5				3		2						3							
Nashville " " Tenn.	Wh.	31,993	6	9.3	1	13.3		2															
	Col.	19,406	10	26 5	4	40 0										2						1	
Memphis " " Tenn	Wh.	18,677	12	33 3	7	58.3		1	1							3		1			1		
	Col.	14,896	12	41.6	4	33 3		3								3		1					
*Mobile " " Ala.	Wh.																						
	Col.																						
New Orleans " " La.	Wh.	163,757	80	25 0	14	17 5	3	13	1	4				4		4		1				17	
	Col.	50 866	92	78 1	13	14 1	2	8		4	1		1	5		5		2	1			30	
Total White		452,747	193	22 9	40	20.7	3	37	2	5	2		1	6	4	15	1	4			2	17	
Total Colored		257,987	219	33.3	55	5 1	5	33		10	1		2	6	2	24		7	2		1	40	1
Total in 33 U. S. Cities	7,084,694	3,250	23.4	1,061	24.7	85	21	478	73	47	113	28	53	36	97	390	25	118	7	30	40	68	41
Mar. 3,—Total in 28 English Cities	8,620,975	3,801	23 0			130				41	22		64		69					27		11	100
Mar. 3, " 8 Scotch Cities	1,233,088	569	25.1			17				15	12		10		12		151			10			45
Feb. 3, " 170 German Cities	8,597,081	4,511	27 3	1,965		100		709	33	173	215		65		76		635			33	23	1	50
Feb. 10, " 171 " "	8,720,795	4,301	25 6	1,901		97		639	16	175	201		39		64		616			43	21	5	45
Feb. 17, " 168 " "	8,684,911	4,328	25.9	1,837		119		658	32	189	164		53		68		595			28	23	2	73

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an urban population of 7,084,694, there died during the week ending March 17, 3,250 persons, which is equivalent to an annual death rate of 23.4 per 1,000, a decided increase on that of the preceding week which was 22.4 per 1,000.

For the North Atlantic cities the death rate was 23.4; for the Eastern cities 25.5; for the lake cities 17.1; for the river cities 20.8; and in the Southern cities for whites 22.9 and for the colored 33.3 per 1,000.

Especially high death rates occurred in New York City, Wilmington, Savannah, Memphis and New Orleans.

Consumption caused 15.7 per cent. of all deaths in the North Atlantic cities, 15.6 per cent. in Eastern cities, 8 per cent. in lake cities, 14.9 per cent. in the river cities, and in Southern cities, 19 per cent. for the whites, and 15 per cent. for the colored.

Diphtheria caused 2.2 per cent. of all deaths in the North Atlantic cities, 3.6 per cent. in Eastern cities, 6 per cent. in the lake cities, 3.5 per cent. in the river cities, and 2 per cent. among the whites in Southern cities.

Typhoid fever caused .3 per cent. of the deaths in the North Atlantic cities, 1.3 in Eastern cities, 2.4 in the lake cities, 3.5 in the river cities and .51 per cent. among the whites in Southern cities.

Scarlet fever caused 3 per cent. of the deaths in the North Atlantic cities, 3 2 per cent. in the Eastern cities, 3.3 per cent. in the lake cities, 4.9 in the river cities and 2 per cent. in the Southern cities.

Pneumonia caused 16.7 per cent. of all deaths in the North Atlantic cities, 13.1 in the Eastern cities, 8.5 in the lake cities, 10.2 in the river cities, 7.7 among Southern whites and 10.9 among Southern colored.

Small-pox continues to prevail in New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 27 new cases of diphtheria, ten of scarlet fever and six of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 14 new cases of diphtheria and 20 of scarlet fever.

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LYNCHBURGH, VA.—Dr. Thos. L. Walker, President Board of Health, reports under date of 17th inst., that there is one case of small-pox in the hospital and none in the city.

RAVENNA, OHIO.—Postmaster W. S. Krake reports (Mar. 17) the continuance of a mild form of scarlet fever in the district.

NEW YORK CITY LUNATIC ASYLUM.—Superintendent Franklin reports ten admissions, eight discharges and one death; and 1,339 insane patients remaining under treatment March 17.

GREENPORT, N. Y.—Postmaster D. Wiggins reports Mar. 19 that scarlet fever is declining, but that a death from diphtheria occurred during the week and four cases of this disease are pending.

PITTSBURGH, PA. —Dr. Snively reports one new case of small-pox.

MILWAUKEE, WIS.—Eighteen new cases of scarlet fever and seven of diphtheria are reported as having been noted during the week.

BALTIMORE, MD.—The return for the week ending March 17 shows 199 deaths; males 112, females 87; under five years 76, over 60 years 37. According to the calculation of the City Board of Health the annual rate of the whole population was 25.30, that of the whites being 21.45, of the colored people 47.67. Small-pox caused 13 deaths, measles one, scarlet fever ten, whooping cough one, diarrhœal diseases none, croup six, diphtheria 12, erysipelas none, typhoid fever two, puerperal fever one, consumption 33, congestion of lungs one, bronchitis seven, pneumonia 18, and violence four.

MICHIGAN.—The report of Dr. H. B. Baker for the week ending March 10 shows the prevalence of the following diseases in the State: bronchitis, neuralgia, rheumatism pneumonia, consumption, influenza, intermittent fever and tonsilitis. The reports from the various observers indicate a general decrease in the amount of sickness. Diphtheria was reported at 14 places, scarlet fever at 19 places, measles at 17 places and small-pox (two cases) at one place, to wit, Detroit.

NEW HAVEN, CONN.—The report for the week ending Marth 10, came too late for insertion in our table. Deaths from all causes 33; deaths under five years 13. Accidents one, consumption three, croup one, diphtheria one, malarial fever one, pneumonia five, bronchitis five, measles one, puerperal fever one and whooping cough two.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports five deaths; under five years, none. One death was caused by consumption, and one by pneumonia.

WATERVILLE, MAINE.—S. W. Bates, C. E., sends mortality reports for the seven weeks ending March 17, the weekly totals being respectively, 5, 4, 2, 6, 2, 1, and 7. Of these 27 deaths, four were caused by consumption, six by pneumonia, one by congestion of lungs, two by accident, and two by scarlet fever. Four of the deaths were of children under five years, and 9 of persons over 60 years.

NEW ORLEANS, LA.—At a meeting of the Board of Health on Mar. 8, it was decided that the quarantine should go into full effect on May 1, and that the period of detention for all vessels from designated ports shall not be less than ten full days from and after said date.

SAVANNAH, GA.—Dr. McFarland's report for the week ending Mar. 10, has been received. Deaths from all causes—white five, colored ten; under five years not stated. Cerebro-spinal meningitis caused the deaths of one white and one colored person. Consumption one and pneumonia one, both colored.

HUDSON CO., N. J.—The monthly report of C. J. Rooney, Jr., for February, an abstract of which will be tabulated hereafter, gives 21.6 as the annual rate for the county as compared with 28.3 during the corresponding month of last year. The rate in Jersey City was 20.5, in Hoboken 27.0 and in the rest of the county 20.8. The general county rate was not above the average of the month for the last six years. Jersey City's rate fell 0.6 below its average, while the rate of Hoboken rose 3.5 above its average. Deaths under five years varied but slightly from the average. Compared with the records of the past February, 1883 was not notably unhealthful.

MEMPHIS, TENN.—The report of the Board of Health (Dr. G. B. Thornton, President,) for the year 1882 shows a total mortality of 1,121; whites 420, males 270, females 150; colored 701, males 361, females 340; under five years, whites 104, colored 289; over 50 years, whites 75, colored 61. The following items are taken from the mortality returns:

White population. Erysipelas caused four deaths, puerperal fever none, diarrhœa 21, dysentery seven, typhoid fever six, malarial fever 42, small-pox eight, whooping cough one, pneumonia 18, congestion of lungs four, bronchitis four, croup two, consumption 52 and violence 21.

Colored population. Erysipelas two, puerperal fever one, diarrhœa 28, dysentery 22, typhoid fever five, malarial fevers 35, small-pox 24, whooping cough 16, diphtheria two, pneumonia 37, congestion of lungs three, bronchitis six, croup five, consumption 107 and violence 26.

The death rate calculated on the population as given by the census of 1880, to wit, 33,593, is for the whites 22.55 and for the colored 46.82, but when calculated on the population as estimated for 1882, to wit, 46,014, the rates are 14.85 and 39.45 respectively.

During the year 365 cases of small-pox were treated. These occurred mainly among the colored people. Sixty-nine of the cases were isolated and treated at their homes in the city, the others, 296, were sent to the pest-house.

BURLINGTON, VT.—In his annual report for the year 1882 Dr. H. H. Atwater, Health Officer, gives tabular statements of the mortality and its causes for the year and for the five years ending December 31 1882.

For the year: Whooping cough prevailed during the first nine months of the year, causing 14 deaths. The only other disease which assumed anything like epidemic proportions was mumps, but this was not fatal in any case.

There were 227 deaths during the year giving a rate of 19.97 per 1,000 (population 11 364 by census of 1880); males 118, females 136; under five years 88, over 70 years 44. Erysipelas caused one death, diphtheria two; croup two, whooping cough 14, diarrhœa and dysentery four, cholera infantum 7, typhoid fever eight, cerebro spinal fever two, cholera morbus three, scarlet fever one, consumption 35, bronchitis seven, pneumonia 18, congestion of lungs two and violence 12.

For the five years: Deaths 1,022, not including 88 still-births; males 505, females 517; under five years 451, over 70 years 152. Rate per 1,000 17.95. Erysipelas caused three deaths, puerperal fever four, diphtheria 69, croup 16, whooping cough 26, diarrhœa and dysentery 24, cholera infantum 65, cholera morbus four, cerebro-spinal fever ten, typhoid fever 16, scarlet fever five, measles three, consumption 137, bronchitis 32, pneumonia 62, congestion of lungs 16 and violence 42.

KINGSTON, JAMAICA.—The Registrar-General's return for February shows 126 deaths, equal to an annual rate of 40.5 as compared with a total of 63 and a rate of 20.5 during the corresponding month of last year. This increase appears due mainly to the fatality of children's diseases, as 43 deaths under five years are registered.

SANTIAGO DE CUBA.—Consul Jno. C. Landreau reports 89 deaths for the month of February in a population of 40,000. Five cases of yellow fever occurred, three of which terminated fatally. The harbor and its vicinity continue free from the infection.

CITY OF MEXICO, MEXICO.—There were 216 deaths during the week ending Feb. 4; under five years, 76; over 70 years, 10. No deaths occurred from small-pox, measles, scarlet fever, diphtheria, croup, or puerperal fever. Typhoid fever caused six deaths, whooping cough one, consumption 16 and pneumonia and bronchitis 59.

VERA CRUZ, MEXICO.—During the month of February there occurred 94 deaths; males 56, females 38; adults 72, children 22. Three deaths from yellow fever are reported.

ENGLAND.—The Registrar-Generals' return for the week ending March 3, gives 23.0 as the average mortality rate in the 28 large towns. Birkenhead recorded the lowest rate, 17.6, and Cardiff the highest, 31.0. No death was referred to any of the principal zymotic diseases either in Derby or in Bolton. Small-pox caused seven deaths in London, three in Newcastle-on-Tyne, and one in Birmingham.

London.—Births 2,773, deaths 1,590. The births were one and the deaths 238 below the average number in the corresponding weeks of the last 10 years. Annual rate 21.0. The deaths included seven from small-pox, 19 from measles, 27 from scarlet fever, 13 from diphtheria, 42 from whooping cough, three from typhus, 15 from typhoid fever, 12 from diarrhœa and dysentery, and 55 from violence.

SCOTLAND.—The return of the Registrar-General for the quarter ending Dec. 31, 1882, records 30,912 births and 19,522 deaths; the former being equal to an annual rate of 32.7 and the latter to a rate of 20.6. In the eight principal towns there occurred 7,618 deaths during the quarter. No deaths were recorded from small-pox. Measles caused 100 deaths, scarlet fever 221, diphtheria 117, croup 123, whooping cough 327, typhus fever 29, typhoid fever 96, erysipelas 32, puerperal fever 34, dysentery 12, diarrhœa 160, ague two, remittent fever five, consumption 723, bronchitis 1,219, pleurisy 26, pneumonia 510, and violence 243.

Consul J. A. Leonard, of Edinburgh, transmits the report of the Registrar-General for the week ending March 3. In the eight principal towns of Scotland the rate averaged 25.1, which is 3.5 above that for the corresponding week of last year, but 2.3 below that for the previous week of the present year. The lowest rate was recorded in Leith, 18.4, and the highest in Glasgow, 28.9. Whooping cough continues to be the most fatal miassmatic disease.

PARIS, FRANCE.—During the week ending Feb 28, there occurred 1,194 deaths; males 661, females 533; under five years, 346; over 60 years, 255. Annual rate, 27.70. Typhoid fever caused 31 deaths, small-pox nine, measles 23, scarlet fever two, whooping cough six, croup and diphtheria 47, dysentery one, erysipelas two, puerperal fever five, consumption 227, bronchitis 56, pneumonia 90, and violence 35.

On Feb. 25 there remained under treatment in the hospitals 89 cases of small-pox, 341 of typhoid fever, and 45 of diphtheria.

The death of M. Bertillon, Chief of the Bureau of Statistics, is announced in this number of *The Weekly Bulletin.*

RHEIMS, FRANCE.—During the week ending Feb. 24, Consul Jno. L. Frisbie reports that there occurred 54 deaths; males 24, females 30; under five years, 24; over 60 years, 12. Population 93,823. Whooping cough caused two deaths, diphtheria and croup four, erysipelas one, measles one, typhoid fever two, bronchitis two, broncho-pneumonia four, pneumonia two, consumption five, diarrhœa one, and violence one.

VIENNA, AUSTRIA.—Consul-General Weaver reports 472 deaths for the week ending Feb. 24; under five years, 170. Annual mortality rate, 32.7. Measles caused two deaths, scarlet fever three, diphtheria six, whooping cough four, typhoid fever five, consumption 136, and acute lung diseases 75.

ST. PETERSBURG, RUSSIA.—Consul-General Stanton transmits the report for the week ending Feb. 17, showing 683 deaths in a population of 929,525; males 391, females 292; under five years, 328; over 60 years, 63. Small-pox caused 24 deaths, and fevers 33. On Feb. 18 there remained under treatment in the hospitals 73 cases of small-pox, 1,149 of fever, and 1,241 of venereal diseases.

COPENHAGEN, DENMARK.—There were 126 deaths during the week ending Feb. 20; under five years, 62. No deaths are recorded from small-pox, measles, scarlet fever or diphtheria. Croup caused one death, whooping cough five, typhoid fever one, diarrhœa six, erysipelas two, consumption 18, pneumonia 11, bronchitis five, pleurisy two, and violence two. Rate 24.76.

During the week the following cases were reported: Scarlet fever 24, diphtheria 81, croup four, whooping cough 48, typhoid fever six, diarrhœa 87, dysentery one, erysipelas 19, puerperal fever two, catarrh 437, pneumonia, 71, tonsilitis 149. No cases of small-pox or measles were reported.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits report for the week ending Feb. 17. Total deaths 82, equalling an annual mortality rate of 24.5 per 1,000; males 35, females 47; under five years, 36; over 60 years, 14. No deaths are reported from small-pox, whooping cough or typhoid fever. Measles caused six deaths, scarlet fever four, puerperal fever one, croup and diphtheria three, diarrhœal diseases five, consumption 16, pneumonia seven, bronchitis ten, and violence three.

During the week ending Feb. 24, the following cases were reported by the physicians: Measles 66, scarlet fever 14, typhus two, erysipelas five, whooping cough 11, diphtheria 11, croup none, typhoid fever five, diarrhœa 22, tonsilitis 22, pneumonia 11, pleurisy one, and bronchitis 87.

MADRAS, INDIA.— During the week ending Feb. 2 there were 266 deaths equal to an annual rate of 34.7; males 119, females 147. Small-pox caused 14 deaths, measles one, fevers 66, dysentery 25, diarrhœa 19 and cholera none.

During the following week, (ending Feb. 9) the deaths numbered 275 equal to a rate of 35.9; males 134, females 141. Small-pox caused 15 deaths, measles one, fevers 90, dysentery 18, diarrhœa 15 and cholera none.

BOMBAY, INDIA.—Consul B. F. Farnham reports for the week ending Feb. 6 that the total number of deaths was 597 being 101 more than in the preceding week, and 91 more than in the corresponding period of the preceding five years. The annual rate was 35.97. Accidents caused 32 deaths, remittent fever 98, acute lung diseases 86, diarrhœa 20 and dysentery 18. Small-pox caused 71 deaths and measles 18 during the week.

SHANGHAI, CHINA.—Vice Consul-General F. D. Cheshire reports Feb. 6 the continued prevalence of small-pox among the natives, and two deaths from this disease among the foreigners.

COLOMBO, CEYLON.—During the two weeks ending Jan. 27 and Feb. 3 there occurred respectively 27 cases of small-pox with two deaths from the disease and 35 cases with eight deaths.

MORTALITY STATISTICS.

RAT PORTAGE, *Feb.* 19, 1883.

To the Editor of THE SANITARY ENGINEER:

The mortality tables published in your journal are a most valuable addition to it, and I think their usefulness could be still further increased by substituting the percentage of deaths from each disease to total deaths for the number of each; also by adding a column for "diseases not specified," which would be useful whether the change is made or not, as at present a large percentage is not accounted for. Trusting it may be convenient for you to make the change which will give expression to numbers, the majority of which now convey but little meaning except to those who have time to work it out in the manner suggested for themselves, I am Yours truly,

R. ADAMS DAVY.

[The publication of reports of deaths by THE SANITARY ENGINEER has thus far been somewhat of an experiment, and it has not been considered worth while to make changes in the forms employed until it should be determined whether the National Board of Health would resume the publication of its Bulletin. Now that Congress has refused to grant to the Board the funds necessary for this purpose, THE SANITARY ENGINEER proposes to make these statistics as complete and as useful as possible. It will soon begin to publish a series of papers on vital statistics, by Surgeon John S. Billings, U. S. Army, in which the subject of methods and forms will be discussed. Meanwhile we beg to remind our correspondents of the importance of forwarding *promptly* and *regularly* the weekly postal card reports upon which our tables are based. When the report from a single city for one week is missing, it makes it almost impossible to draw accurate conclusions from a comparison of the table for that week with that of other weeks.

The special points urged by our correspondent will receive due consideration. The cost of the labor of calculating weekly percentages of each disease for each city would be considerable, and we think hardly justified by the value of the results. It may, however, be worth while to make such calculations for groups of cities. As regards the number of cases from diseases not specified, that is so easily found from our table, and is of so little interest, that we really do not see its utility. For example, take the report from Cambridge in the table in this journal. During the week ending Feb. 24 there were 23 deaths, 13 of these are reported under specified causes and of course there were ten due to causes not specified.

We shall, however, endeavor to get this table into the most practically interesting and useful form possible, and as the first step towards this end we solicit prompt and regular reports.]

FIRST REPORT OF THE STATE BOARD OF HEALTH OF ARKANSAS, from it Organization April 27, 1881 to December 1, 1882. 181 pp., 8vo. Little Rock: 1883.

We are glad to welcome another new-comer to our collection of State Health Reports, and hope it is the first of a long and valuable series. The present report is mainly taken up with an account of the organization of the Board and with tables of reports of deaths in Little Rock. These last are given by months, and the ratio per 1,000 of estimated population has been calculated for each month, but

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the compiler has forgotten to give the total for the year, which is a serious mistake in such a table, intended as it for educational purposes.

The attention of the Board was called to the bad sanitary condition of that portion of the State House occupied by the Supreme Court, by a very suggestive letter from John R. Eakin; but it does not appear that the Board made any any investigation or definite recommendation in the matter.

An interesting note is furnished by Dr. D. H. Dungan relative to the outbreak of choleroid diarrhœa in Little Rock in December, 1880, due to the use of water from a well within, thirty feet of which was a leaky sewer. It is almost unnecessary to say that "the water was remarkable for its crystalline purity." Water thus contaminated is almost always considered to be of superior qnality by those using it.

We are sorry to see the Board endorsing the highly exaggerated and sensational report in the prevention of venereal diseases, made by Dr. Gibson, to the meeting of the American Health Association in New Orleans. If the State Board wishes to retain the confidence and support of the public and of the medical profession, it will hereafter let this subject severely alone; in fact, we can hardly conceive a more certain mode of committing suicide for a health board than to follow the lead of this report.

The total amount appropriated for the expenses of the Board for two years was $3,000, of which there had been expended to date of the report $1,822.77. In its next report we hope the Board will furnish some definite information as to the prevailing diseases in the State, the sanitary condition of certain localities, etc., etc.

JAMES O. MORSE.

Mr. James O. Morse, one of the earliest members of the American Society of Civil Engineers, for many years its treasurer, and for the last thirty years engaged in steam heating engineering in this city, died of apoplexy at Englewood, N. J., the 8th inst. Mr. Morse's health had been impaired for two years, necessitating a partial withdrawal from business. He was struck down in his office in this city on the 5th, and died three days later.

In early life Mr. Morse, who was born at Cherry Valley in this State in 1818, graduating from Hamilton College in 1836, was a civil engineer, and was employed on the Genesee Valley Canal, and in locating the route of the New York and Erie Railroad west of Port Jervis. He was the first assistant to A. J. McAlpine in constructing the U. S, Naval Graving Dock at Brooklyn. On the completion of this work Mr. Morse built the Savannah Water Works. He then came to New York and entered the business of iron pipe and fittings at 79 John street, afterward removing to 76 John street, where he carried on the business until his death.

Mr. Morse was for many years interested in steam heating, doing some large jobs for their day, notably the A. T. Stewart uptown and downtown stores and Bellevue Hospital. In 1869 he constructed the Bergen County, N. J., Gas Light Company's works, of which he was president, and under his personal supervision the topographical survey of Englewood Township was executed.

Mr. Morse was an intimate friend of the late Robert Briggs, in conjunction with whom (shortly before Mr. Briggs' death), he made a sanitary survey of the Equitable Building in this city, which was the basis of a joint report by Mr. Briggs and Mr. Morse.

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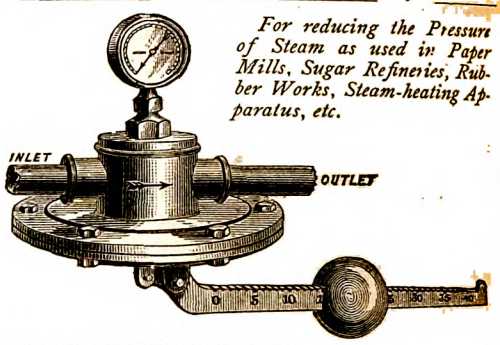

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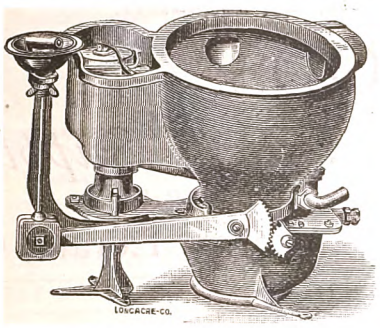

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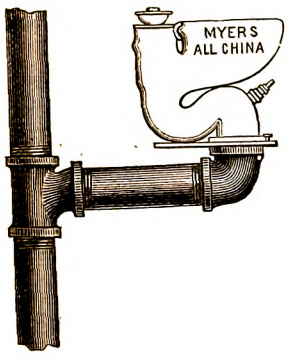

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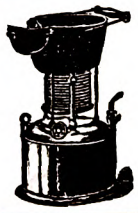

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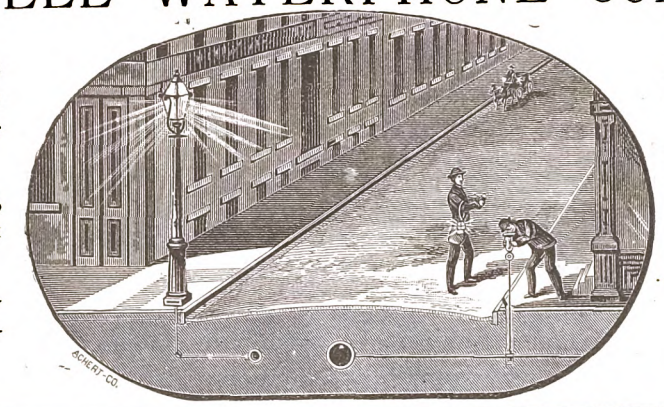

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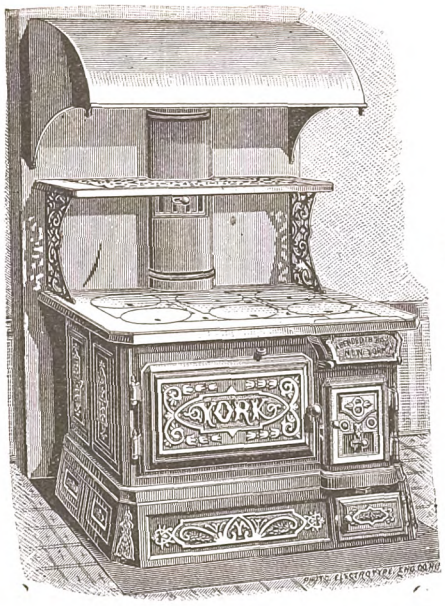

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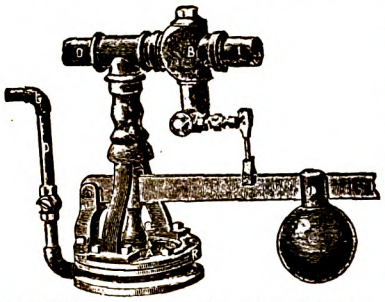

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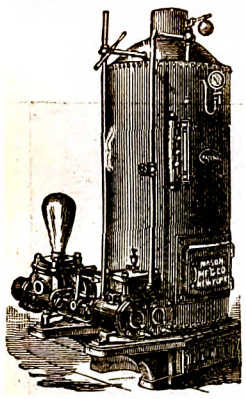

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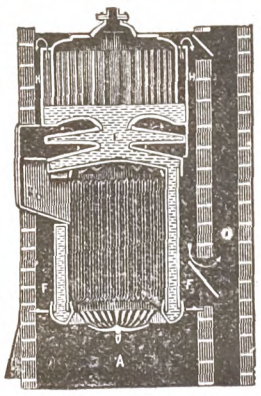

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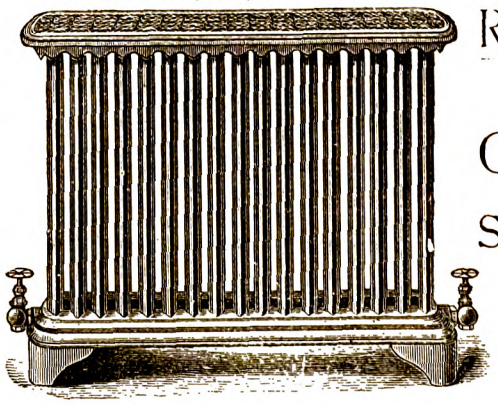

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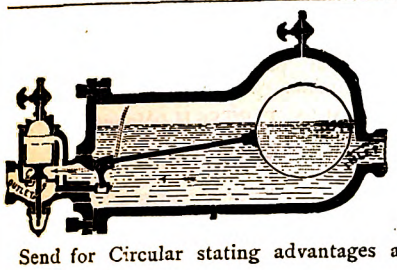

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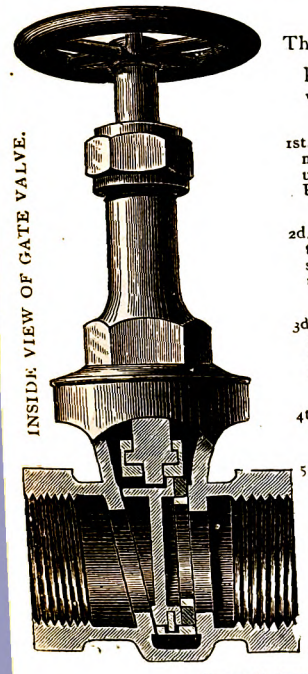

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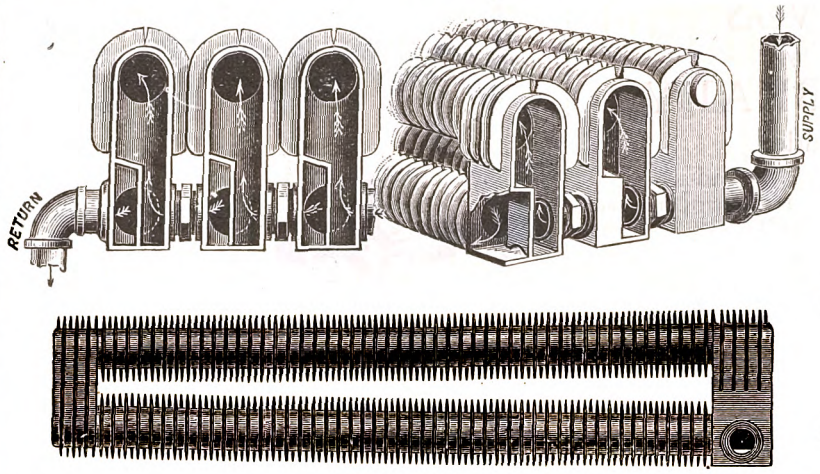

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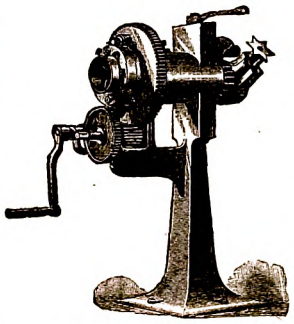

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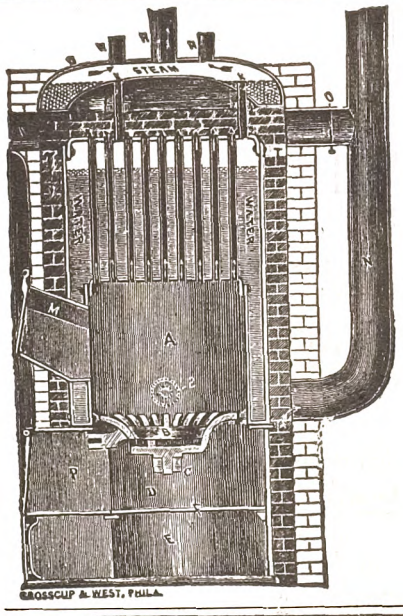

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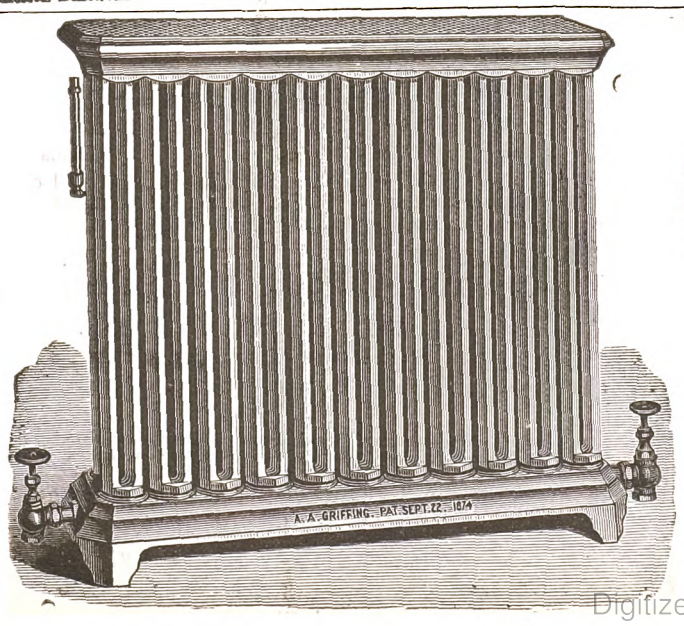

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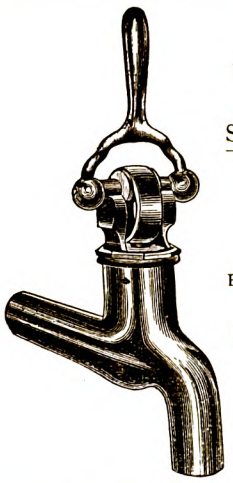

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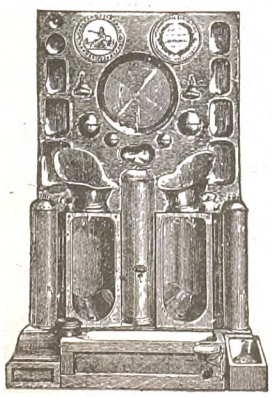

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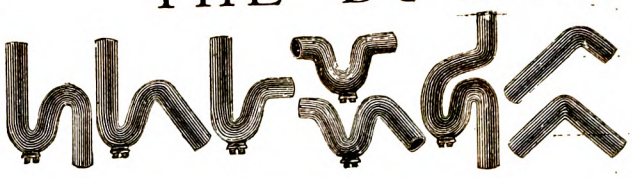

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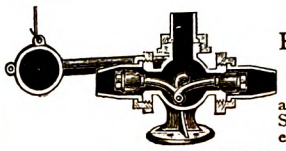

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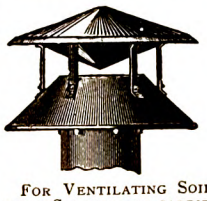

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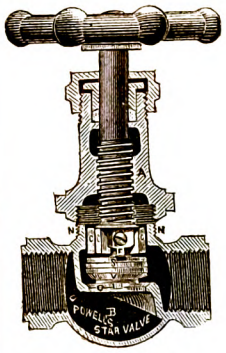

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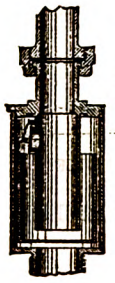

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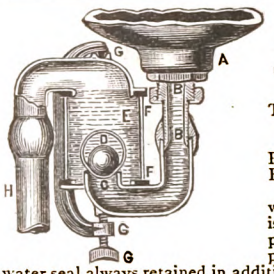

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It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted Glass or metal section furnished at same price. Send for circular and price list.

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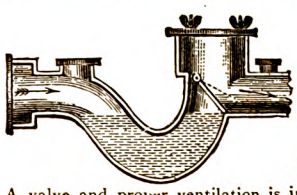

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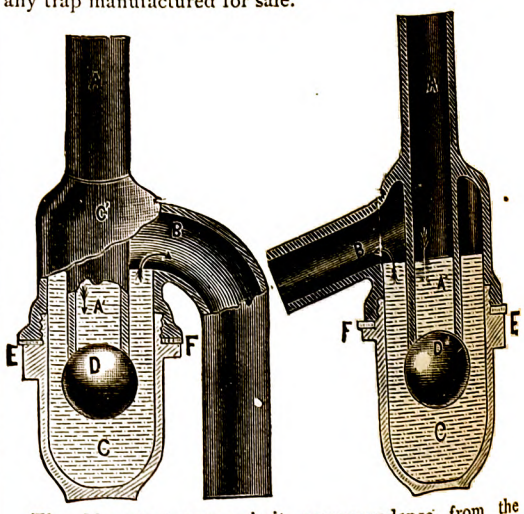

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Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

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The pipe *B*, connected with the trunk, can be run into a heated flue when desired.

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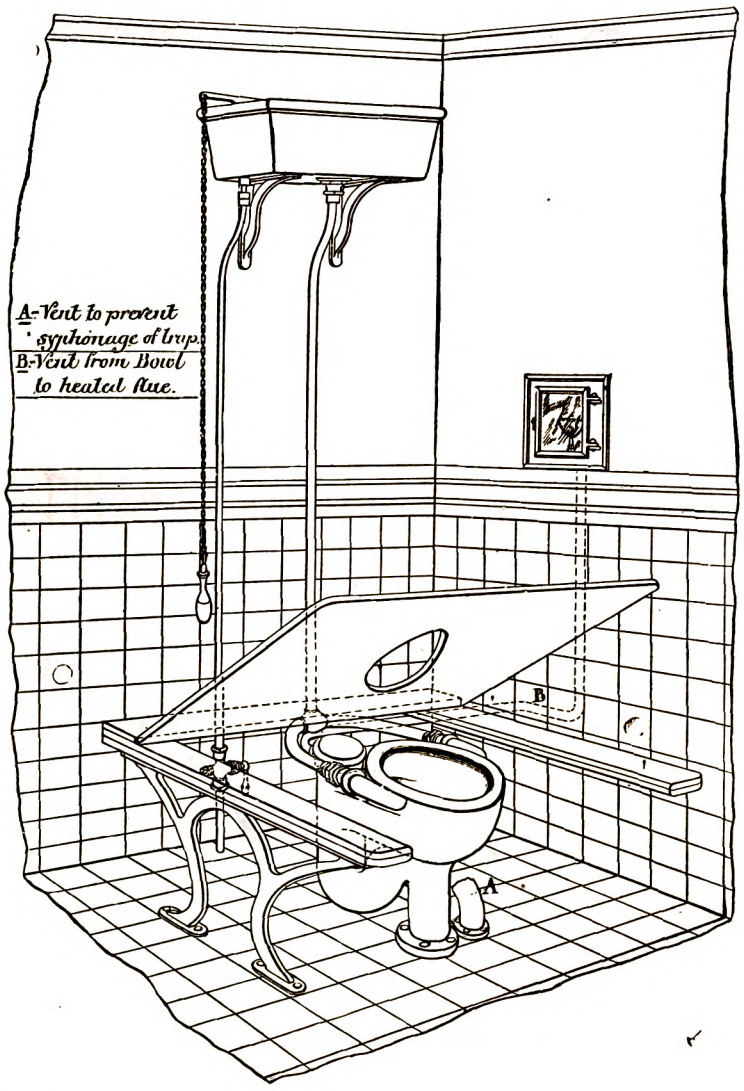

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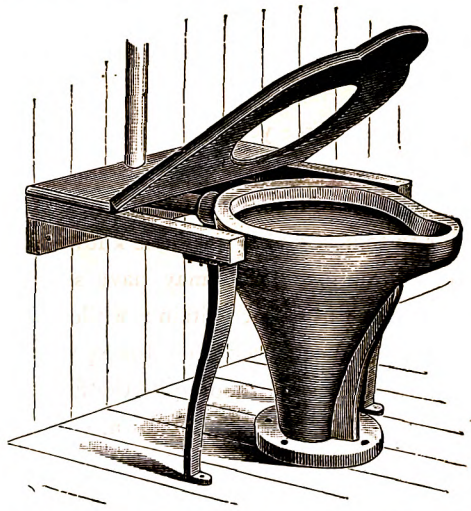

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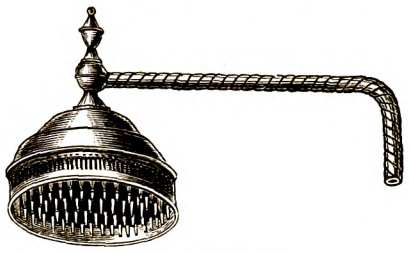

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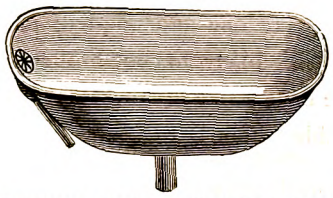

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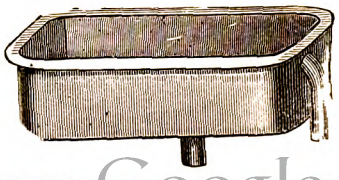

BUTLERS' SQUARE PANTRY SINKS.

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Prior to that period it was little known, except to those Americans who may have seen them when traveling in Great Britain; while it is true that they had been used there for 25 years, and were universally conceded to be the finest thing in the way of a Bath Tub known, yet, like all things supposed to be new and of high cost, they required extensive advertising to secure their acceptance and use to any considerable extent in the United States.

The effect of numerous expressions of opinion, made without either knowledge or experience to justify them as to their durability and utility, had to be counteracted, yet, as a result, we have succeeded in having them selected for some of the most elegant residences that have been erected within the past ten years. They have also been used in several hospitals, for which places we make a special, less elaborate, and cheaper class of fittings.

A personal inspection will convince any one of their superiority. Their increased cost over that of an ordinary copper-lined bath tub should not be a consideration to those who can afford to live in a house worth over $15,000, and would not be if their cleanliness, inviting appearance and durability was appreciated.

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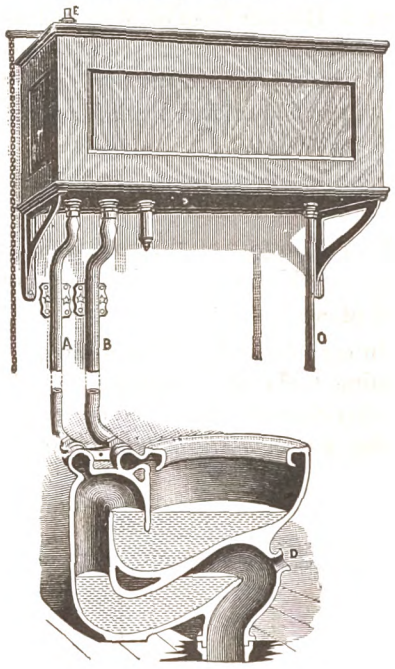

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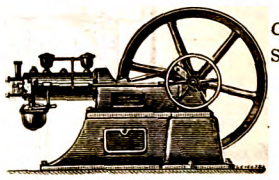

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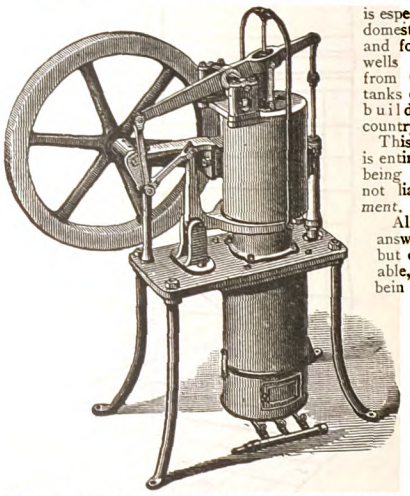

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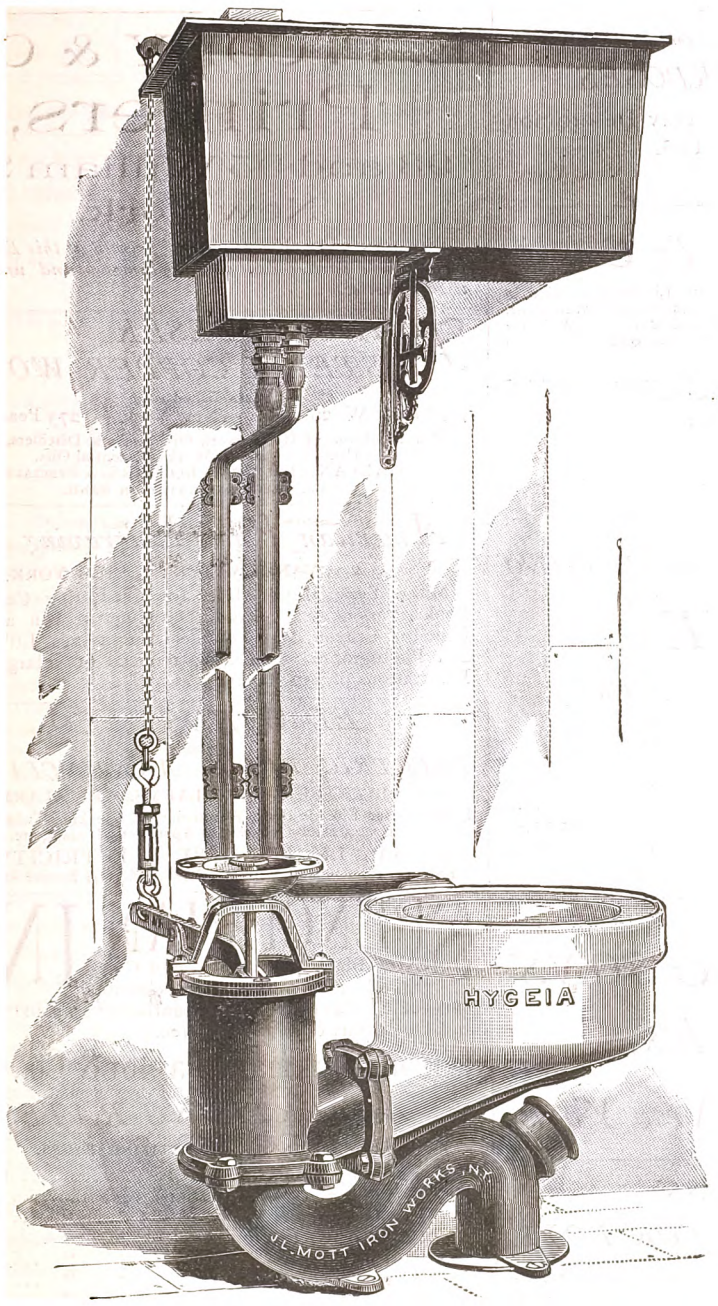

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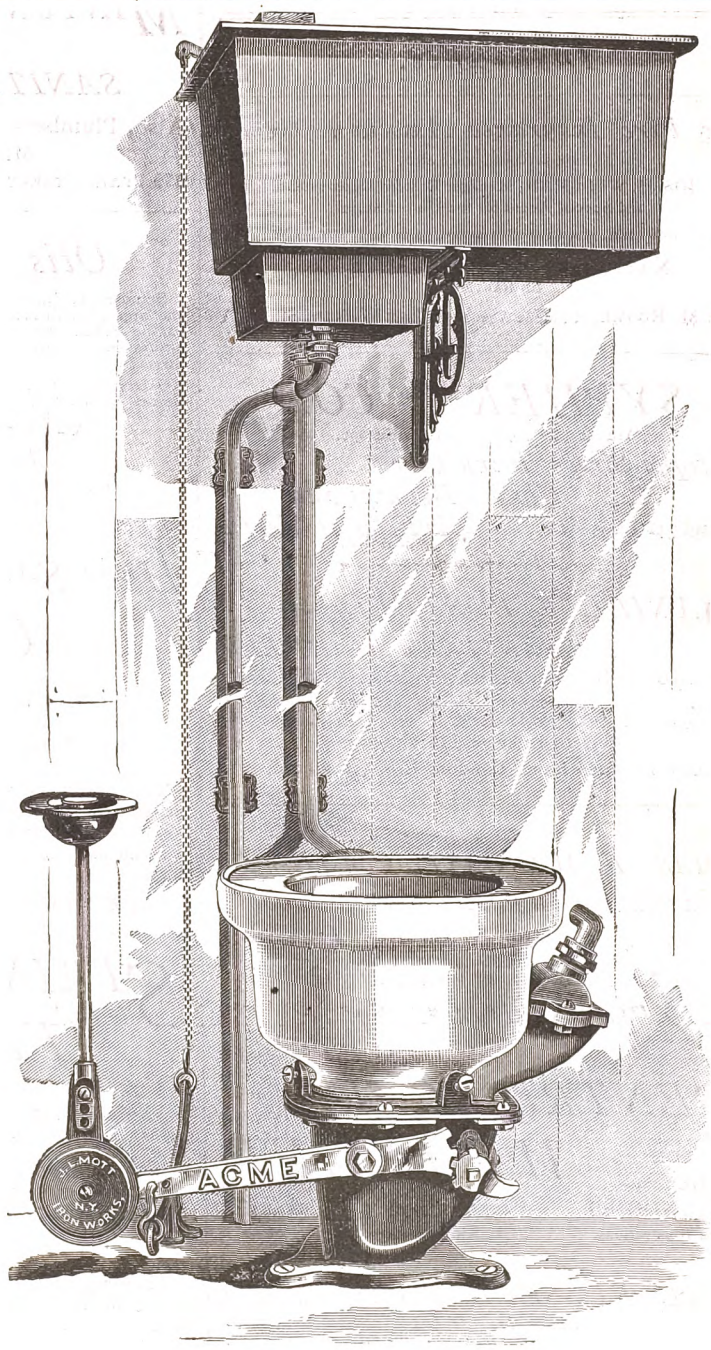

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PLUMBERS' PROFITS.

It is reported that efforts are being made to have Master Plumbers from all parts of the United States meet in convention in this city in June, to discuss measures looking to some concert of action on the part of these gentlemen, with regard to the alleged practice on the part of certain wholesale dealers in plumbing materials of selling to consumers at wholesale rates and ignoring master plumbers in the transactions. In fact, it is even stated that in certain instances the prices have been less than those quoted to responsible and reputable men engaged in carrying on the business of plumbing, who have a shop and keep competent workmen in their employ.

It is further said that cases have occurred where dealers have offered to sell materials to a party building a house, and have, in fact, furnished a so-called journeyman plumber to put them in, these dealers at the same time pretending to do no plumbing, and soliciting and receiving the trade of men in the plumbing business. No doubt, to many persons, this practice may seem all right, and will be justified on the ground that the question is controlled by the laws of trade, and is the necessary consequence of the active competition growing out of the multiplication of firms, within the last ten years, who manufacture and deal in plumbing materials, and that it is not different from the prevailing custom with other trades identified with the construction of buildings.

It is asserted that wholesale dealers who conduct their business in this way, attempt to justify their action by stating that the plumbers do not protect each other, that when they estimate on work, they frequently take jobs for less than the cost of materials, and when, under such circumstances, the dealer sells to the plumber, the owner really gets the materials for less than they are worth; sooner or later the plumber fails, and is unable to pay for the goods used. They therefore hold that under the circumstances if they want to sell their goods and get paid for them, they had better deal directly with the transient customer, and take his cash; and that, as their trade with plumbers is so scattered, they can yet retain a great deal of it, since many of their customers do not know of these practices; and as a matter of fact, they do retain a great deal of plumber's trade.

We have all along supposed that there has been an improvement in the business of those plumbers who are known and have the confidence of their customers, and we think the letter, elsewhere printed, from a gentleman in Worcester, relates an experience that many of our readers have had; yet there may be others less fortunate, who, from various circumstances beyond their control, have suffered from competition with the people they buy of. If such be the case, it strikes us that our Worcester correspondent's method is the only feasible plan of dealing with the problem.

This is a question on which a great deal can be said on both sides, yet we are firmly of the opinion, that the continued increase of the practice here complained of, will result in injury to the community where it prevails, as well as demoralization to a legitmate business. If within the plumbing trade men of character, reputation and responsibility, are to be retained, and others induced to enter it, the occupation must hold out hopes of pecuniary reward. That the occupants of our houses will be safer if such be the case, no one familiar with the subject will question. We are, therefore, glad to hear of this movement, and shall take an interest in its progress, of which we propose keeping our readers informed; meanwhile, we shall be glad to hear their experience, in this particular, in their respective localities.

HOW A SCHOOL COMMITTEE GOT A WARMING AND VENTILATING APPARATUS.

A correspondent informs us that the usual mode of procedure in warming and ventilating buildings is for the interested parties (owners or committees) to ask three or four steam fitting houses to submit plans and prices for warming, etc., the specification generally being oral and as follows: "To properly warm the building and do everything in a first-class manner, with all the newest improvements."

The question is, "What do they want?" The best? They don't know what the best is, but reason that some one of the houses will submit something that is very good, and that they are business men enough to select the best.

A case in point was that of a school committee of five who asked three firms to bid on the warming of the new school house.

A came first, and looked the building all over, and then asked, "Who else is going to bid on it?" "Oh! B and C. Yes, I know them. B got the school in the other ward; *he was the lowest*, and C took the opera house block from us. Beat us by $5. I think I might as well withdraw. I cannot do that kind of work."

Then B and C came and saw the building, and found out who else was going to bid on it (information which was eagerly given for the purpose of stimulating competition), and B remembered where A and C had beaten him in price on two or three different occasions, but reflected that

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now he knew pretty well what their practice was, and decided he would catch them both this time.

The day for opening bids and examining proposed plans came, and all three were on hand with their big envelopes. A's bid was $4,000, C's bid $3,200, and B's bid $1,908.98.

A and C were friends now, and began to compare notes, and one said, "What can he do for $1.900? Why, the stock alone for such a job will cost that. But neither of them waited until the night session in hopes that their better specifications and more thorough plans would be the means of securing them the job. No, they knew the cheapest man would win.

At the night session the secretary of the board read the specifications aloud, and the committee all examined a fine drawing submitted by A, but when they began to discuss the relative merits of the different propositions they found they were mixing matters and requested the secretary to read them all over again. But then found they were not sufficiently posted in technical matters to properly comprehend the differences, and one proposed to tabulate and see what that would do for them, but they found the items could not be made to correspond in any way, as the details were entirely different, the modes of heating not being the same. After another hour's fruitless endeavor to learn which was the fittest plan aside from the price, one of the committee said, "You will notice that the guarantee is about the same in all; but I also wish to call it to the attention of the committee that we are obliged to let it to the lowest responsible bidder, and I cannot see why one plan is not as good as the other." * * *

B got the job, but had to sue for his money, the court decided it was done according to the specification, and he was accordingly paid. * * * They are putting a new apparatus in that school now.

NEW YORK'S WATER SUPPLY.

No. XI.

THE SUPPRESSION OF WASTE.

(Continued from page 386.)

In the preceding articles we have endeavored to show what, in the absence of stringent regulations, is inevitable in any community that has a public water supply, namely, that habits of wastefulness are formed, grow, and become difficult to control; that sooner or later, as a direct consequence, scarcity prevails and demands exceed anticipation. Hitherto these demands have been met by taking possession of available sources of supply or increasing pumping facilities. Such sources, however, are rapidly becoming scarce, and the pumping is found to be expensive; indeed our conditions are rapidly assuming the proportions found in Great Britain, and like Great Britain we must grapple with this problem of waste and its prevention.

The experience obtained there we have briefly outlined in foregoing chapters, and so far as we are acquainted with the facts, we have given our American cities credit for what they have done in that direction, though we regret so little is to be recorded. It now remains to enumerate the methods that might be made available in the City of New York—provided the needed money and powers be granted—and to suggest the various conditions involved that seem to require consideration.

First. The placing of a meter in every house, assuming no control over plumbing, but relying on consumers' desire to economize in water tax to secure a stoppage of waste, to cause the reconstruction of defective plumbing and the removal of wasteful fixtures.

This plan suggests the following points for consideration:

Will the knowledge that water is to be paid for by measurement have the effect of preventing any considerable number of our people from bathing, and from using sufficient to properly flush water closets and urinals, thus producing unsanitary conditions?

Can this be obviated by allowing an ample amount per capita for legitimate use, for which a specified tax is to be made, said tax to be paid whether this water is used or not, but whatever may be used in addition thereto to be paid for by measurement?

Since large numbers of consumers are tenants, moving every year, are they likely to find it cheaper to retain leaking fittings, wasteful fixtures and pipes exposed to frost, paying the water rates required, rather than go to the expense of reconstructing the plumbing in a house owned by another in which they have but a temporary interest?

Would a consideration of the foregoing indicate that the use of meters would make the supervision of plumbing in buildings superfluous in this city?

What measures should be adopted to ascertain when waste was taking place under ground?

What would be the probable expense of placing meters in the 95,000 houses in New York? that is, cost of meter and expense of setting them, and what time would be required to do it?

What would be a fair amount to charge for interest on the outlay, cost of repairs and maintenance, and what amount per year should be allowed for wear and tear?

What amount would be required for the clerical staff to keep the accounts and render quarterly bills, which would seem necessary if the bills are to be relied on to enforce care in the use of water?

What number of inspectors would be required to take the readings of the meters?

Should the city pay for meters, if it is decided that they be used, or should the Providence plan be resorted to, namely, revise the water rates so that a charge be made for every tap and fixture, unless the houseowner elects to accept and pay for a meter, it being understood that a specified tax shall be paid whether water is used or not, but only the excess of this specified amount to be charged for by measurement?

If the general use of meters in this city is objected to, and systems of inspection are to be relied on, are the inspections to be made only where waste is indicated by the adoption of some agency like the Deacon Meter, Bell's Waterphone, Church's Indicator, or any other device, to indicate the flow of liquids?

Are examinations of premises to be restricted to those in which some outside agency indicates waste is occurring?

Would the interest on the cost of adopting and maintaining some outside agency to determine where waste, either underground or in a building, was prevailing, be more than offset by the facility of reaching leaks, the probable employment of a smaller force of inspectors, the being able to have a check on their operations, and the exemption of householders whose fittings are in good order, from periodical visits and the annoyance attendant thereon?

If fittings were required to conform to a standard, to be examined and stamped (fees to be charged therefor), would not the occupants of the houses, or those who buy them, be saved the expense of frequent repairs, early renewals, and would waste in any measure be prevented?

Is it possible in a large city, with a large moving populaton, occupying buildings erected or owned by others, to secure the proper location of pipes and the use of proper fittings in the absence of rules rigidly and constantly enforced?

With the conditions existing in New York, what outdoor agency to indicate when waste was taking place, either in or outside buildings, could be adopted with the best advantage, taking into account cost and results to be obtained?

If the former two plans are deemed impracticable, is there any that can be adopted that will secure any reasonable results other than the Manchester system, which requires the testing and stamping of fittings, that plumbing work be done in accordance with prescribed rules, and that all wasting or wasteful fittings be replaced by approved and proper ones, and that all buildings, and all parts of buildings, where water flows shall be frequently inspected? And must the annoyance to houseowners therein involved, be imposed?

Would any system secure adequate results that did not involve the testing and stamping of fittings, supervision and control of plumbing, inspection of buildings, repair or removal of defective and wasteful fixtures?

Which of the plans described would involve the constant employment of the smallest permanent staff in proportion to the results obtainable?

We have here indicated some of the questions to be considered by those who may be required to adopt and sanction a plan for cities like New York; and they are ones on which we should be glad to get the views of such of our readers as have had experience in these matters. It will be evident that, no matter which method is adopted, a considerable expenditure of money is inevitable, that with one scheme the first outlay may be larger and the cost of maintenance more, while another, though probably more annoying to householders, involves a smaller investment and a less cost of maintenance, though to obtain adequate results, requires a better system of administration, and a better class of men, than have hitherto been selected for such duties.

It is clear that something must be done and the longer it is put off the more complicated becomes the problem and the greater the final expense.

A demand from the Commissioner of Public Works for the needed money to carry out any effective plan, will, in the present condition of public sentiment, meet with opposition and suspicion.

Without discussing the causes that produce this feeling we are of the opinion that the best thing to be done under the circumstances, is to have the Mayor appoint a commission of three gentlemen, who have the confidence of the public and the profession, one of whom, at least, shall be a civil engineer of experience in the matter of water supply and distribution, and who is not directly or indirectly interested or identified with any system or plan. These gentlemen should take testimony and investigate the subject thoroughly, and, as soon as practicable, recommend a plan. They should also submit a bill for enactment, if any additional legislation seems to them necessary.

If this is done, and any reasonable plan honestly and efficiently carried out and enforced, this city will be relieved from severe burdens and very possible calamities, and if the information we have gathered and recorded will in the slightest degree contribute anything toward the accomplishment of so desirable a result, we shall feel amply repaid for the labor envolved in the preparation of these articles.

The Society for the Prevention of Cruelty to Children have reported to Inspector Esterbrook the results of an inspection of the condition of the schools and homes of the charitable and religious organizations in this city. On the whole their report is better than might be expected; nevertheless the lack of adequate means of escape in case of fire, which is the principal cause of complaint, ought to receive the earnest attention of the Department of Buildings. Several of the cases seem to be such as should rather have been reported to the Board of Health, as they involve defects of plumbing which, we infer, can be remedied at no great expense or trouble It is well that there is in this city an organization which is making it a special duty to ascertain and report the actual condition of buildings of the character here noticed.

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PLUMBING IN AN OFFICE BUILDING.

The sketches we present this week, show some of the plumbing done by Mr. T. J. Byrne, in the "Duncan Building," at the southwest corner of Pine and Nassau streets, this city, which has for some months been undergoing reconstruction and is now nearly completed.

Figure 1 shows the water closets as arranged on each floor, one set above another set. The most notable feature, and that to which we would call special attention, is the extensive use of tile on the floor and walls, illustrating the growing tendency to substitute tiling for woodwork in such places. The floor, in front of the platform on which the closets are placed, is wholly of unglazed tile, of different patterns and colors on the several floors. The border of the platform is of marble, but the whole remaining surface of white glazed tile. The earthenware closets are set directly on this tiled floor, and are not enclosed. The only wood about them is the seats, which are supported on cleats fastened to the polished hard wood partitions and hinged at one end to turn up against the partition. The latter ends more than a foot above the floor, being supported by the wall behind, and a leg or small pillar in front. The ends of these wooden legs are protected by high brass collars to keep off the water when the floor is washed. The doors in front of each closet are of slats and reach only to within a foot of the floor. Free circulation of air is thus allowed between the different closets, and between the closets and the room. The entrance to the room is in front of the middle closet, and over the door is a transom window. On the right is a large window (4 x 6 ft.), into a covered court about 25 feet square, and in the corner near it (behind the slop-sink), a ventilating shaft about 2 ft. square, containing the pipes, and having an opening, covered with slats, about eight feet above the floor. The walls of the room, to a height of six feet, are covered with glazed tiles.

The closet traps are ventilated by 2-inch pipes *a, a*, from the crown, which run to the wall and several feet up on the same separately, before joining, as shown. The main vertical pipe *b*, into which the separate vents are branched, increases in size toward the top, from two to four inches. The vents, *c c*, from the closet side of the trap, are arranged in the same way. Of the latter, the two shorter horizontal branches are 1½ inch, and the longer branch to the right hand closet 2-inch. The main line, *d*, is 2-inch, and like the branches, is of galvanized iron.

The 3-inch pipe, *g*, coming through the casing of the shaft on the right, and ending in a funnel on the top of a 4-inch pipe, which passes back into the shaft, is the overflow from the tank. It does not strictly belong in this sketch, since it is found only on the top floor, while the room shown is one below. On the top floor the trap of the earthenware slop-sink is within the shaft behind it, and the tank overflow enters the dip of this trap, the arrangement shown on the casing being to break the connection between the tank and house-drain. The top of the funnel is covered with course wire netting, except where the pipe *e* enters it. The whole arrangement in sight is of copper.

The closet trap, and waste and ventilating pipes are imbedded in the cement forming the platform, being at first supported on small brick piers, on the brick arched floor and not on blocks of wood as represented. The horizontal pipe coming to the front in the floor under the slop-sink *f*, is a 3-inch waste pipe from two urinals in the corner, opposite the sink. These are shown in the smaller drawing, Figure 2. The partition slabs, back and floor, are of marble. The notable feature is the method of connecting the waste pipes with the trap. The foot waste is directly over the trap, into the dip of which the urinal wastes connect. The trap is 3-inch, the branches 1½ inch, and the vent from the crown of the trap 2-inch.

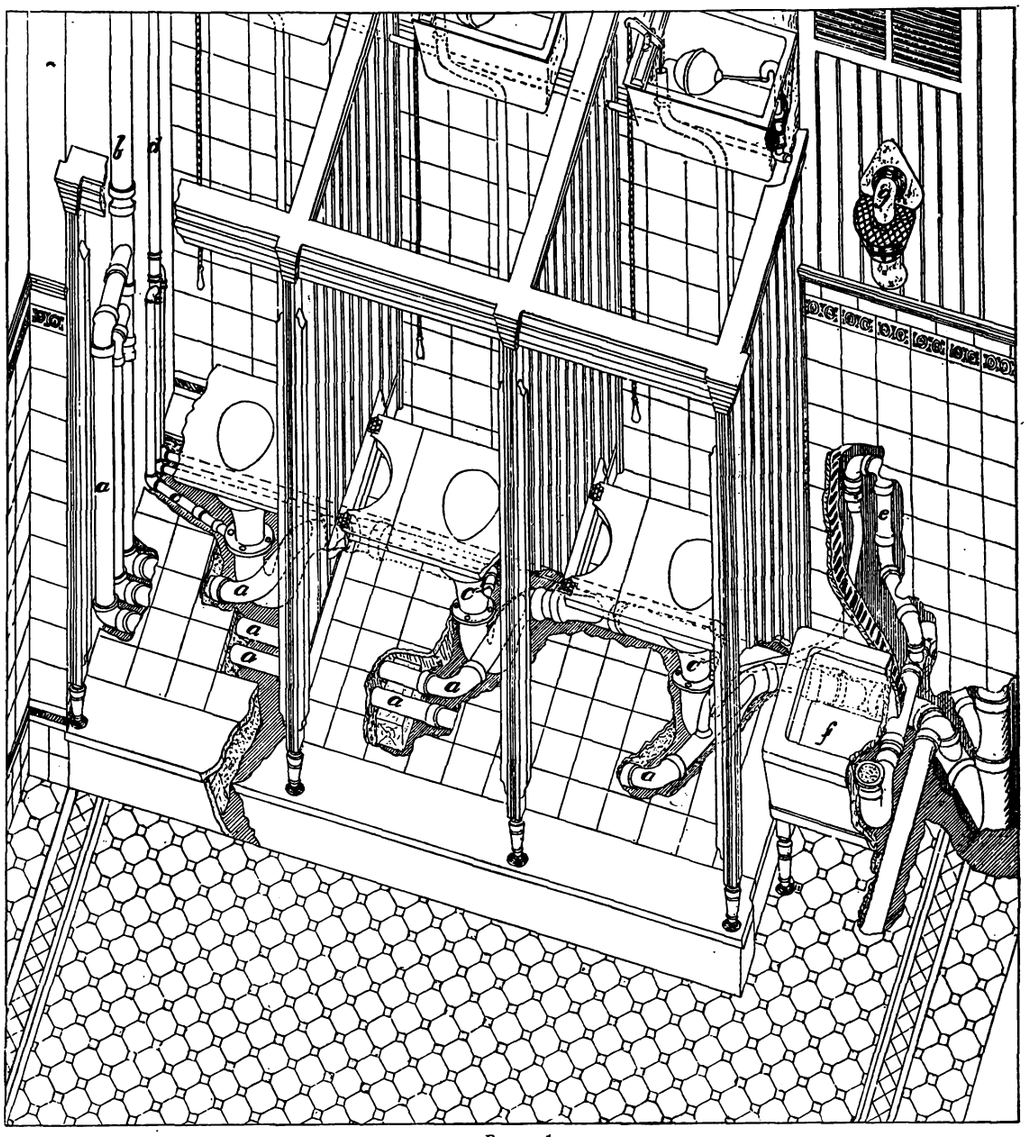

FIGURE 1.

Figure 3 shows a horizontal boiler in the janitor's kitchen on the top floor, supported by brackets on the wall over the range. The peculiar feature of interest is the return by a ½-inch (galvanized iron) pipe *b*, to above the tank, of the 1¼ inch supply *a*, from the tank to the boiler, or in other words, taking the relief pipe from the cold water pipe instead of the hot. The pipes *c* and *d*, to and from the water-back, are 1¼-inch, and the hot water pipe 1-inch. This supplies only fixtures in the janitor's apartments. The offices are supplied from a large boiler in the cellar, the arrangement of which we may hereafter describe.

Hamilton, Ont., has a course of lectures on Sanitary Science. In the fourth of the series, Dr. W. Oldright spoke of the pollution of house sites, and thought they should be inspected by competent officers before dwelling houses were erected. It is a fact that many houses are built upon "made up" ground that are a source of constant trouble. Hollow

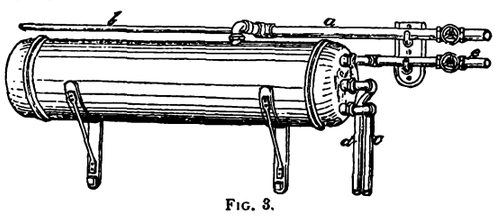

FIG. 3.

places are often filled up with rubbish frequently containing garbage, which ferments and gives off gases dangerous to health. This filling is covered with a few feet of earth, and soon presents the appearance of a good building lot. To improve our sanitary condition the doctor recommended: (1) Inspection, not only of building sites, but also of buildings, during the course of their construction, by a health officer. (2) Better architectural plans for admitting sunlight; the air cannot be pure in a room that is cut off

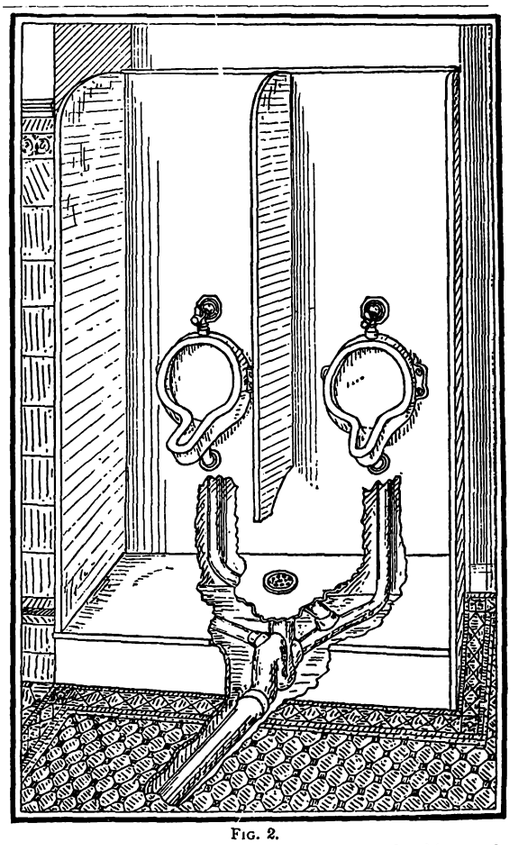

FIG. 2.

from the direct rays of the sun. (3) Better plumbing and proper means for ventilating sewers. (4) Adequate provision for exchanging the air of dweling houses by the constant introduction of pure air.

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STEAM FITTING AND STEAM HEATING.

BY "THERMUS."

No. XIX.

DIRECT RADIATION.

Va'ue of Heating Surfaces.

It is generally supposed that a square foot of surface in steam pipes within a room has the same value, no matter how or where they are placed.

Specifications generally call for a certain amount of surface in radiators or coils, as the case may be, seldom giving dimensions, thereby relieving the contractor when the given amount of surface is furnished, as if it were so many pounds of pig iron the contract called for.

It is no uncommon thing, within buildings with two rooms of the same capacity and same cooling conditions generally, to find one comfortably warmed in cold weather while the occupants of the other are complaining. The heating surfaces are the same, and their positions are alike, and no apparent cause can be found for the difference. But a close observer notices, that in one room (the cold one) the radiator is four pipes wide and ten pipes long, and that in the other, the comfortable one, the radiator is two pipes wide and twenty long, and wonders if that can have anything to do with the difference of temperatures of the rooms.

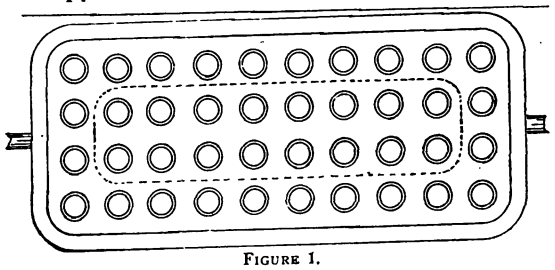

FIGURE 1.

In 1862 the late Joseph Nason conducted a series of experiments on different classes and different arrangements of heating surfaces, to decide this question. His experiments were conducted within a room kept at a temperature of between 70° and 71°, with steam between atmosphere and one pound, with the smallest movement of air possible; in other words, with a still atmosphere warmed by direct radiation. He found that within this room a wrought iron pipe, one inch in diameter, in a horizontal position, condensed 6.56 ounces of water per square foot of outside surface per hour, the movement of the air being only that caused by the pipe itself.

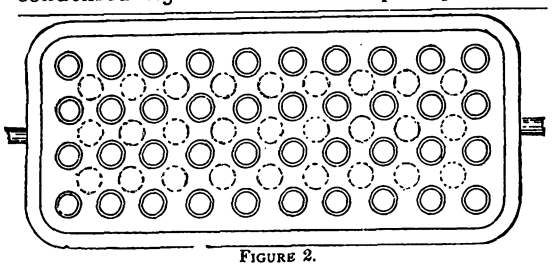

FIGURE 2.

With a plain and heavy cast iron pipe 3 inches in diameter and 5 feet long, with conditions the same, he found the condensation to be 5½ ounces of water per hour per square foot of outside surface, and with a pipe of the same size and metal, only very much thinner, he found the condensation to be the same.

In his experiments on the same size pipe (3 inches), the surface increased by ⅜-inch ribs, one-half inch from center to center, he found the condensation reduced to 4.4 ounces, but with heavier ribs placed one inch between centers, he found the condensation slightly increased (4.49 ounces). With curved rib cast iron radiator, M. T. & Co., he found the condensation 4.3 ounces; box radiator, cast iron, with straight vertical ribs, 3.63 ounces, and with vertical cast iron pipe rib radiator (7 sections), 3.8 ounces.

With experiments conducted on two of the Nason vertical wrought iron pipe radiators—which may be said to represent all one-inch wrought iron pipe radiators, with pipes 6 feet 2 inches long—he found that single rows condensed 5.7 ounces of water per square foot of surface per hour, but that double rows condensed but 3.93 ounces.

The inference to be drawn from the above is that long pipes stretched around a room have the greatest efficiency, and that short, vertical, plain surfaces in single rows, whether cast or wrought, rank next, and that vertical pipes, or any pipes in close clusters, decrease in efficiency (for direct radiation) in a ratio much beyond popular conception.

Long vertical tubes will not give as high an efficiency per square foot of surface as short ones, in consequence of the warm envelope of air which surrounds themas it goes up; the air's capacity for taking heat from the pipe lessening with its own rise in temperature.

The height of vertical tube radiators as they now exist is a matter of convenience only, and when it is necessary to reduce them one half to go under low window sills, it has been found they are not reduced one half in efficiency.

The radiating power of a radiator may be considered equal to the outside surface of its outside rows of tubes only, and its power to warm air by contact, by the ease and rapidity with which the vertical currents of air can come in contact with the surfaces. Bases, with openings through them, between the vertical rows of tubes, add materially to their value as air warmers.

The diagrams are top views of radiator. Figure 1 showing a radiator ten pipes long by four pipes wide, the pipes in the centre bounded by the dotted lines having comparatively little value. Figure 2 shows the same radiator, with holes through the base, showing whereby close clusters may be made very nearly as efficient air warmers as single rows would be.

The views on this subject above given, and the results of the experiments of Mr. Nason, apply only to direct radiation, the results from warming surfaces being entirely different for clusters with forced circulation, as for indirect radiation. There the surfaces must be massed and finely divided, the height of the radiator depending on the temperatures required within the rooms, and on the velocity of the air.

If the quantity of air moved in a given time is comparatively small, it will be necessary that the temperature at which it enters the room will be higher than when larger bodies of air are moved (the temperatures of the rooms for the time to remain the same) and consequently will require greater heating surfaces, the increase of surface to be in the direction of the height of the heater.

When the quantities of air delivered in a given time are great, the surface must be reduced, so that the heat supplied for the time will be the same.

The heat taken from these coils is almost entirely by convection, the heat radiated being small, and only that amount of it utilized which strikes the metal casing, from which it is then taken by the air which comes in contact with it.

J. H. Mills says, in experiments conducted by him on natural and forced draughts over wrought-iron pipe heaters laid horizontally, that with 66½ square feet of surface with a pressure of steam of 6½ lbs., with the lineal velocity of the air 410 feet per minute, through a 15x14½ opening, that he condensed 9.32 of an ounce of water per square foot of surface per hour, and delivered the air at 138° F., and that, with a velocity of 1,210 feet, all conditions remaining the same, except the steam pressure, which was 5 lbs., he condensed 15.64 ozs. of water, and delivered the air at a temperature of 135° F., the initial temperatures being 84° and 94° respectively.

[TO BE CONTINUED.]

PLUMBERS' PROFITS.

It has been suggested that we reprint an article which appeared in the third number of our first volume on Plumbers' Profits, since many of our present readers have probably never seen it. We have been informed that it has been, on some occasions, of service in securing the payment of disputed bills. We, therefore, here give it:

From THE SANITARY ENGINEER, *Feb.* 18, 1878.

In our last issue we stated under this title that the merchant or banker whose annual transactions are by the million naturally looks upon a gross profit of 30 or 40% on the part of a plumber as something monstrous; yet on a moment's reflection any fair minded man will admit that the margin of profit should be governed entirely by the nature of the business, the amount possible to do safely in a year, and the proportion of expense in doing the business to the amount done. To illustrate: In this city there are about nine hundred so-called plumbers, besides a large number of idle journeymen ready to take any job that offers. The average amount of business done by each firm is not over $10,000 annually, including contract work for builders, jobbing, and days' work. As a rule, contract work pays little or no profit to men who do the work properly and pay for the labor and materials, and it is only taken by good parties to keep extra journeymen employed. Allowing a man to do an annual business of even $20,000, what gross profit should he require to pay his business expenses and have left a living and something to lay by for a rainy day? for every man hopes to make something besides shelter, food, and clothing.

EXPENSES AND LOSSES.

Rent of store, which must be in location accessible to customers who live in best parts of the city	$1,000
Book-keeper and clerk to attend store while proprietor is giving personal attention to work	800
Interest on capital, and sundry expenses doing business, collector, etc	500
Keep of horse, wagon, and boy for driver	500
Bad debts in jobbing business, not counting possible losses through working for speculating builders	500
	$3,300

If these figures are correct, and we believe they are, we contend that 30% average gross profit is not exorbitant, but entirely legtimate. Merchants know that different articles pay varying degrees of profits, and as certain materials used by the plumber are limited to 5% and 10% margin, others must pay more to make up the average. For instance, the proportion between the different rates of profit may be thus represented in tabular form:

$5,000 @ 10%	$500
6,000 @ 25%	1,500
5,000 @ 40%	2,000
4,000 @ 50%	2,000
Yielding gross profit	$6,000
Deduct expenses	3,300
Net profit	$2,700

Few plumbers in this city make $2,700 net annually notwithstanding the hue and cry made about exorbitant profits, and where it has been made we contend it is not too much, considering the hazards of business, for a man to make, who has the intelligence and capability that would render it safe to employ him to attend to such important matters as house plumbing. It is, however, too much to pay ignorant men to do imperfect work, and the public should not employ the latter class and thus curtail the business of the former, making it necessary to obtain an even greater margin on a smaller business.

In this article it is not proposed to insist that any one should pay these profits, but only to show that what in some branches of trade might be exorbitant, is in this business only reasonable, legitimate and necessary, even considering the matter simply from a mercantile standpoint.

LEAD BURNING APPARATUS.

In response to inquiries from correspondents for information about lead burning we have obtained the following description from Mr. Thomas H. Walker, of Kansas City, Mo., of the apparatus of which he is the maker.

KANSAS CITY, MO., *March* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Yours of the 21st is received asking for description of lead burning and apparatus. I herewith send you some hurried sketches and descriptions which I hope will give your correspondents the information they desire; as you know it is impossible to give anything like a detailed description in so small a space. If there is any farther information desired, I will gladly give it.

Fig. 1 is a rough sketch of my improved apparatus complete, as I furnish it ready for operation. *A* is the acid chamber, *B* the generation chamber, *C* stop valve, *D* connecting pipe, *E* trap screw for cleansing and charging, *F* gas cock, *G* emptying plug, *H* dryer, *I* gas conducting hose, *J* burner. The advantages I claim for this machine

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are, 1st, the pressure can be regulated (to suit the work on hand) from ½ lb. to 6 lbs. per square inch, giving the full range of pressures required for working lead from ½ lb. to 30 lbs. per square foot, also all weights of pipe. I have given the most necessary directions of preparing the work to be learned in the following cuts

Fig. 2 shows the mode of preparing the sheet lead for the ordinary flat butt seam. Fig. 3 shows the manner of preparing the lead for upright seams. In Fig. 4 I have given the appearance of the different kinds of burning, section and plan. *A* is a lapped flat seam, *B* is a butt flat

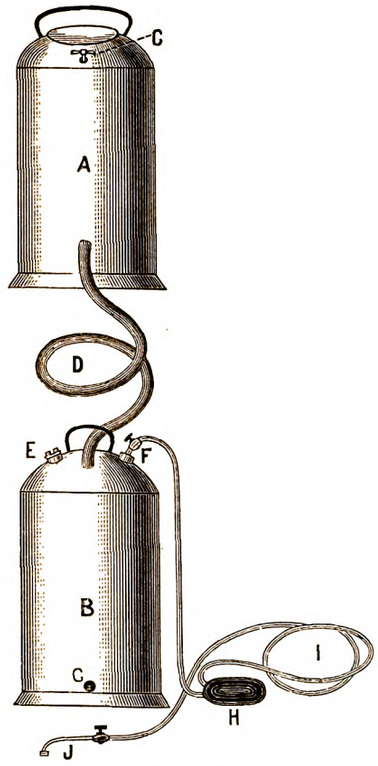


FIGURE 1.

seam. In these there is a bar of lead used in burning. *C* is a perpendicular upright seam, *D* is a horizontal upright seam, no bar being used in either of these, the operation cutting the lead necessary for the seam from the edge of the overlapping sheet, with the flame.

Fig 5 shows the styles most used for fitting patches. *A*, *B*, *C*, *D* and *E* are of the kind most used—this being where the lower end of patch can be cut through the sheet (see section at the left). *F* is a kind I have employed in making large connections with chambers while in use, by first mounting the connections on the patch, then burning

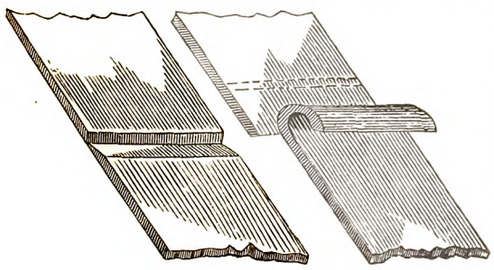


FIGURE 2. FIGURE 3.

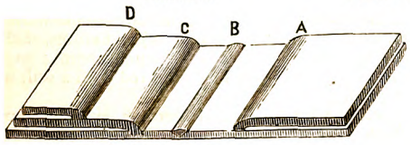


FIGURE 4.

the patch to the sheet before cutting through. *G*, *H* and *I*, are another kind of patch that are not cut through the sheet, but that require a great deal more skill than any of the foregoing, as the lower part is over-hanging, and are the most difficult of any shown. None of these require a bar, the lead necessary being cut from the front sheet with the flame, as in *C*, *D*, Fig 4.

Fig. 6 shows a section of pipe and sheet work in which the pipes are flanged and all seams made with the bar, the pipe being upright and the sheets horizontal.

Fig. 7 shows a section of pipe and sheet work in the same position as Fig. 6, but where the sheets are flanged to receive the pipes, and one end of pipe opened to receive the other; no bar is used, the lead being cut from the flanges to make the joint.

Fig. 8 shows the different ways of doing work on horizontal pipes. The sheets are upright, thus being the reverse of Figs. 6 and 7. *A* shows the manner of fitting where the operator has to work on the side of sheet that pipe leaves. *B* shows the manner where the work must be done on the opposite side of the sheet. *C* shows the

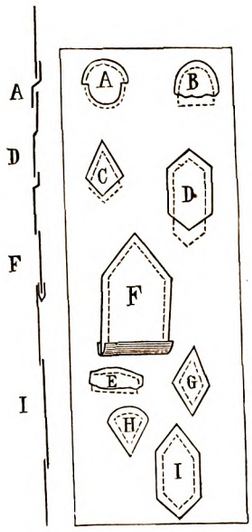


FIGURE 5.

manner of making a joint on a horizontal pipe of small dimensions. The slits are cut and the lead turned back to allow of the lower half being burned inside, then burned through, and the lead worked back into shape. The upper half and the slashes are burned, thus finishing the joint. *D* is the mode employed when the pipe is of large dimensions, where the operator can get inside to burn the lower half, then burn through and finish on the outside.

These are a few descriptions of work that I have done where the nature of the work would not allow of it being

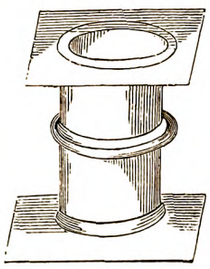


FIGURE 6.

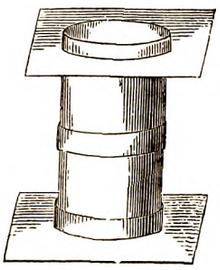
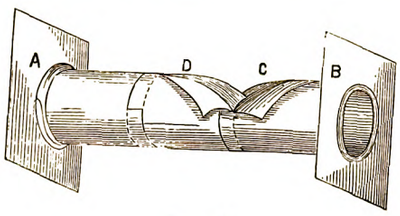


FIGURE 7.

moved. Where the work is small, and can be turned and handled, it is very simple and will not need any description.

I will say here, for the information of those who will ask where I get my oxygen, that I get it at the point of combustion, and can do as much and as good work as with any machine.



FIFURE 8.

In conclusion, I will say that this is a very limited description, but hoping it will give your correspondents and readers the desired information, and be of interest to you and them, I am, Yours, respectfully,

No. 1310 Baltimore ave. THOMAS H. WALKER.

THE PHILADELPHIA PLUMBING ORDINANCE.

We print below the text of the proposed plumbing ordinance for the City of Philadelphia, together with the report of the committee to whom the matter has been referred.

We dislike to criticise details of a measure that, it appears, has been considered by gentlemen who should know what the needs of Philadelphia are; yet there are several points that might be made more clear, and our object in calling attention to them is to have them so framed before it is too late.

Section I. provides for the registration of both master and journeymen plumbers. Section II. requires that a license fee of twenty dollars shall be paid for such license. Is the journeyman to pay twenty dollars license? If not, and we certainly cannot believe that this is intended, it should be so stated, and not left possible to place that construction on the section.

Rule 1, which proposes to look after the qualificatious of plumbers before granting a license, is capable of doing much good if intelligently enforced. A provision in Section V. of the regulations is:

"All house drains or soil pipes laid beneath the cellar floor shall be of proved, tar-coated cast iron pipe, with well leaded and caulked joints; or of first quality hard-burned, vitrified terra-cotta pipe, with joints of the best cement (at the option of the owner, together with the approval of the Department)."

It then provides that all other drain pipes, or "where pipe is above the cellar floor, shall be tar-coated cast iron pipe, carried ten feet outside house walls," and in Section VI. we find that "the house drain must have a fall of not less than ⅛ of an inch to the foot. It shall run along the cellar wall, unless this is impracticable."

Now, this latter clause is sound and should be adhered to. We imagine that there can be few houses to be erected in Philadelphia where it would be impracticable to place the drain above ground in the cellar; indeed, this should be a cardinal rule, and the burying of a drain beneath a cellar bottom should be absolutely prohibited.

One reason given to us for not following New York in these regulations requiring drains inside a house to be exposed, is "that the sewers in New York are not sufficiently below the street surface to admit of a drain buried below the cellar bottom, consequently, they had to be placed on the wall; but "in Philadelphia a buried drain could readily be connected at proper grade with the sewer."

This is a great mistake. In New York the sewers are, as a general thing, laid at greater distance from surface than those in Philadelphia. The real reason for the New York rule is that experience has shown that only the speculative builders want to put down the tile drain *inside a house*, because they can employ laborers to do it, cover it up, and save a few dollars; but sooner or later the future owner or occupant of the house is compelled to dig up this drain, which is almost invariably found to be leaking, and go to the expense of putting in an exposed iron one, which requires skilled labor to put up, and in which defects, if they exist, can be detected. That is the one and only reason.

In any case where special circumstances require that the drain be placed below the cellar bottom, the following clause in the New York Rules better meets the case than Section V.:

"4. The house drain must be of iron, with a fall of at least one-half an inch to the foot, if possible.

It should run along the cellar wall, unless this is impracticable, in which case it should be laid in a trench cut at a uniform grade, walled up on the sides and provided with movable covers, with a hydraulic concrete base of four inches in thickness, on which the pipe is to rest."

This burying of a drain pipe inside the four walls of a house cannot be too strongly opposed. If this law is for the benefit of the occupants of the houses to be hereafter erected in Philadelphia, and we fail to recognize any other legitimate reason for its enactment, and if their safety is to be considered, the "option of the owner" clause, it strikes us, should be stricken out, since it is clearly for the benefit of the bonus builder. We imagine that at this day few, if any others, will avail themselves of it, and his is certainly the last interest to be considered in an ordinance like this. His purpose is to build as many houses as he can and dispose of them; sanitary plumbing being the last thing that concerns him.

We believe that with many Philadelphia houses it is possible to lay a house drain outside a house, there being vacant space between the houses. If that be so, the use of vitrified pipe below ground should be confined to such

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cases, but under no circumstances should it be permitted *inside* a house. There is not a plumber of the seven composing the Committee of Twenty-one but well knows that not one tile pipe drain in five laid below ground in Philadelphia houses is tight; that with the present knowledge on the subject, its future use inside houses will be mainly by *bonus* builders, and that no inspection which Philadelphia will be likely to have, can ensure the laying of this pipe so that it will be tight.

No, gentlemen! if you want to protect the people who are to live in *bonus* houses, strike out this option clause, and insist that a drain in a house shall be exposed or easily accessible, but in no case buried.

In Section XIII. the words "except where the supply of water is assured" should be stricken out. No such assurance can be safely made in Philadelphia at this time.

Sections XVII. and XVIII. are capital. Philadelphia has had the benefit of the experience of other cities, and we congratulate the gentlemen whose labors have produced the bill we have commented on. We trust they will be able to act on the suggestions herein made, and that the bill may speedily become a law, even if our views are not entirely concurred in, for we regard it as a good move, and in the right direction.

PHILADELPHIA, *March*, 13, 1883.

To the Select and Common Councils of the City of Philadelphia.

Gentlemen:—We, your Committee on Surveys and Regulations, to whom was referred the accompanying communication and ordinance, regulating Plumbing, and House drainage, Registration and Licensing of Plumbers, beg leave to report, that they have held several meetings and visited New York and Brooklyn, where there is municipal control of these matters, they carefully examined their laws and those of several other cities, and for the purpose of a thorough knowledge of our local requirements, invited the co-operation of a Committee of Twenty-one, composed of plumbers, architects, and physcians, who after numerous meetings, reported to us a complete set of regulations. We think that public health demands a thorough supervision on the part of the City. We submit the annexed ordinance and regulations, and recommend the passage thereof.

E. B. MORRIS, *Ch'n for rep.*,	JOS. H. BROWN,
JAS. R. GATES, *for rep.*,	WILLIAM MCMULLEN,
DALLAS SANDERS, *for rep.*,	A. A. GRACE,
JAMES WHITAKER, *for rep.*,	JOS. L. JONES,
THOS. M. HAMMETT, *for rep.*,	EDWARD MATTHEWS,
THEODORE D. SPEAR,	EDW'D W. PATONT,
CHAS. A. KAUFFMAN,	JOHN SIMMONS,

CHARLES LAWRENCE.

AN ORDINANCE.

To regulate the Plumbing, House drainage, Registration, and Licensing of plumbers in the City of Philadelphia.

SECTION 1. *The Select and Common Councils of the City of Philadelphia do ordain*, That on or before the first day of July, 1883, every master or journeyman plumber, carrying on his trade in the City of Philadelphia, shall and must, under such rules and regulations as are herein prescribed, register his name and address, with and at the Survey Department of said City, and after the above date it shall not be lawful for any person to carry on the business of Plumbing in said City, unless his name and address be registered as provided, and he or they shall have procured a license for the same.

SEC. 2. Each and every person or firm shall, before obtaining said license, pay to the Survey Department the sum of twenty dollars, and upon the payment of said sum he shall receive from the above Department a license to carry on said business from the above date for the term of one year. Each and every license must be renewed on or before the first day of July, in each and every year.

SEC. 3. The Chief Engineer and Surveyor shall appoint eight inspectors, to be approved by Select Council, whose duty under and subject to his direction shall be to examine all plumbing and house drainage work, and if the same be in accordance with the rules and regulations, herein contained, he shall give certificate of approval, a copy of which shall be filed in the Department.

SEC. 4. A list of the registered plumbers of the City of Philadelphia shall be published at least once in each year, the time and paper to be named by the Committee of Councils on Survey.

SEC. 5. The expenses of this branch of the Survey Department shall be paid from the fees received for licenses. All blanks, forms, plans, and specifications to be furnished by this Department, and no charge made therefor, and no expense to be entailed on any person other than the fee for the license, all fees for license to be paid into the City Treasury, and Councils shall make such appropriations as may be necessary for the carrying out of this ordinance.

SEC. 6. The salaries of the Inspectors shall not exceed one hundred (100) dollars per month, or more than the revenue received from license, and so much of said revenue is hereby appropriated as may be necessary for the payments herein provided for.

SEC. 7. Any person or persons violating any of the provisions of this ordinance, or of the rules and regulations contained therein, shall be deemed guilty of a misdemeanor, and shall be subject to a fine of twenty (20) dollars for the first offence, fifty (50) dollars for the second offence, and for subsequent offence, forfeit his or their license, said fines and penalties to be collected by due process of law, prescribed for the collection of like penalties.

RULES AND REGULATIONS.

I.—*Registration and Licensing of Plumbers.*

RULE 1. Every person engaged or about to engage in the plumbing business in the City of Philadelphia shall appear in person at the office of the Survey Department for examination as to his qualifications as a plumber, and if found competent he shall be registered and receive a license; and no person other than a licensed and registered plumber shall be allowed to carry on or engage in the plumbing business or make any connection with any sewer, drain, soil, or waste pipe, or any pipe connected therewith.

RULE 2. Each license must be renewed during January of each year, and it shall be the duty of every plumber to give immediate notice of any change in residence or place of business, for the correction of the Register.

RULE 3. Any plumber violating the rules of this Department shall be liable to a fine of twenty (20) dollars for the first offence; fifty (50) dollars for the second offence, and for any subsequent offence shall forfeit his license at the discretion of the Department; and any other person so offending shall be liable to a fine of not less than twenty-five (25) dollars nor more than one hundred (100) dollars, to be collected upon the complaint of any citizen before a magistrate.

II.—*Plans and Specifications.*

The plumbing and drainage of all buildings, public and private, shall be executed in accordance with plans and specifications previously approved in writing by the Survey Department; and suitable drawings and descriptions of the said plumbing and drainage shall, in each case, be submitted and placed on file in the Survey Department, said drawings and descriptions to be furnished by the architect or builder where one is employed; any application for a change in plan must be made in writing by the owner or his authorized agent.

Drawings and descriptions of the plumbing and drainage of buildings erected prior to the passage of the act may be placed on file in the Survey Department.

Blank specifications for plumbing and drainage will be furnished on application at this office.

As the law requires that the plumbing and drainage be executed according to a plan approved by the Survey Department, the work must not be covered or concealed in any way until after it has been examined by an inspector of the Survey Department; and notice must be sent to the Survey Department when the work is sufficiently advanced for such inspection.

When the plumbing or drainage of buildings erected prior to the passage of this ordinance has been inspected and condemned, plans must be filed and the new work or alterations shall be executed in accordance with the rules and regulations.

III.—*Qualtity of Material and Workmanship.*

All materials shall be of good quality and free from defects; and the work must be executed in a thorough and workmanlike manner.

IV.—*Inspection.*

All soil or waste pipes before being connected with fixtures shall have openings stopped and the peppermint test (or such other test as the Department may require), applied for inspection.

The drain, soil and waste pipes, and the traps, shall, if practicable, be exposed to view for ready inspection at all times, and for convenience in repairing. When placed within walls or partitions and not exposed to view, or covered with woodwork, fastened with screws, so as to be readily removed, or when not easily accessible, extra heavy pipes shall be used at the discretion of the Department. In no case shall they be absolutely inaccessible.

It is recommended that while building, recesses shall be left in the walls for all soil or waste pipes of 3 inches or over.

V.—*Material of House Drains.*

The main drain of every house or building shall be separately and independently connected with the street sewer, or with a main of sufficient capacity, at the discretion of the Department. All house drains or soil pipes laid beneath the cellar floor, shall be of proved tar-coated, cast-iron pipe, with well leaded and caulked joints; or of first quality hard-burned vitrified terra cotta pipe, with joints of the best cement (at the option of the owner together with the approval of the Department). All other drain, soil, or waste pipe connected therewith, or where main drain pipe if above the cellar floor properly secured, shall be of tar-coated cast-iron pipe, carried 10 feet outside of house walls or five feet beyond vault, if any.

VI.—*Arrangement and Ventilation of House Drains.*

The house drain must have a fall of not less than one-eighth of an inch to the foot.

It shall run along the cellar wall, unless this is impracticable, in which case it shall be laid in a trench cut at a uniform grade.

The arrangement of soil and waste pipes shall be as direct as possible. All changes in direction shall be made with curved pipes, and all connections with soil or waste pipes shall be made with Y-branches and one-eighth bends.

It shall be provided with a running trap placed at an accessible point inside of cellar wall nearest to the sewer. The trap shall be furnished with a hand hole for convenience in cleaning, the cover of which shall be properly fitted and the joints made tight with some proper cement.

There shall be an inlet for fresh air entering the drain just inside the trap, or at the rear end of system, of at least 4-inches in diameter, leading to the outer air and opening at any place not too near a window.

VII.—*Construction of Vertical Soil and Waste Pipes.*

Every vertical soil pipe shall extend at least two feet above the highest part of the building or contiguous property, of undiminished size, properly hooded or capped. They shall not open near a window nor an air-shaft ventilating living rooms.

Where a separate line of waste pipes are used, not connected with sewer pipes or cesspool, they shall also be carried 2 feet above the highest part of the building or contiguous property. There shall be no traps on vertical soil or waste pipes.

VIII.—*Quality and Weights of Soil Pipes.*

All drainage or ventilating iron pipes shall be sound, free from holes, and of a uniform thickness of the following standard weights:

2 inches,	3½ pounds	per lineal	foot.
3 "	4½	"	"
4 "	6½	"	"
5 "	8	"	"
6 "	10	"	"
7 "	13	"	"
8 "	16	"	"
10 "	25	"	"
12 "	37½	"	"
15 "	45	"	"

And for large buildings the use of what is known as Extra-Heavy Soil Pipe is recommended, which weighs as follows:

2 inches,	5½ pounds	per lineal	foot.
3 "	9½	"	"
4 "	13	"	"
5 "	17	"	"
6 "	20	"	"
7 "	27	"	"
8 "	33½	"	"
10 "	45	"	"
12 "	54	"	"

Before they are connected they shall be thoroughly coated inside and outside with coal tar pitch, applied hot, or some other equivalent substance.

IX.—*Joints and Connections.*

All joints in the cast iron drain, soil, and waste pipes shall be so caulked with oakum and lead, or with cement made of iron filings and sal-ammoniac, as to make them impermeable to gases.

All connections of lead with iron pipe shall be made with a brass sleeve or ferrule, put in the hub of the branch of the iron pipe and caulked in with lead, except in cases of iron water closet traps or old work when drilling or tapping may be necessary. The lead pipe shall be attached to the ferrule by a wiped joint.

All connections of lead pipe shall be by wiped joints.

X.—*Traps.*

Every water closet, sink, basin, wash-tray, bath, and every tub or set of tubs, shall be separately and effectively trapped. The traps must be placed as near the fixtures as practicable. All waste pipes shall be provided with strong metallic strainers. All drains from hydrants shall be trapped below frost, and in a manner accessible for cleaning out.

XI.—*Air Pipes.*

Traps shall be protected from syphonage by a special air pipe, not less in diameter than the waste pipe; if it supply air to a water closet trap, not less than two inches in diameter, the size to increase with the number of water closets. All container water closets must be supplied with fresh air and be properly ventilated as approved by the Department.

Every vent pipe shall be of lead, of galvanized gas pipe, or of cast-iron pipe, tar coated.

These pipes shall either extend two feet above the highest part of the building of contiguous property, or they may be branched into a soil pipe above the inlet from the highest fixture. They may be combined by branching together those which serve several traps. These air pipes must always have a continuous slope, to avoid collecting water by condensation.

XII.—*Drip or Overflow Pipes.*

All drip or overflow pipes from safes under wash basins, baths, urinals, water closets, or other fixtures, shall be by a special pipe run to some conspicuous point; and in no case shall any such pipe be connected with a soil, drain or waste pipe.

No waste pipe from a refrigerator, or other receptacle in which provisions are stored, shall be connected with any drain, soil, or other waste pipe. Such waste pipes shall be so arranged as to admit of frequent flushing, and shall be as short as possible, and disconnected from the refrigerator.

The overflow pipes from tanks shall discharge into an open-trapped fixture, or into the bowl of the water-closet itself, not into the soil or waste-pipe, nor into the drain or sewer.

XIII.—*Water-Closets.*

Every water-closet, or one line of water-closets on the same floor, shall be supplied with water from a special tank or cistern (the water of which is not used for any other purpose), except where the supply of water is assured. When the pressure in the water main is not

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sufficient to supply these tanks, a pump must be provided.

Water-closets must not be located in the sleeping apartment of any building, nor in any room or apartment which has not direct communication with the external air either by a window or an air shaft, having an area to the open air of at least four square feet.

XIV.—*Cisterns.*

Cisterns for drinking water are objectionable. If decided indispensable by the Department, they shall be constructed of iron or of wood. The overflow shall discharge into an open-trapped fixture, never into any soil or waste pipe, or water-closet trap, nor into the drain or sewer.

NOTE.—Water-tight brick cisterns built underground for drinking purposes are not included.

XV.—*Rain-Water Conductors.*

Rain-water conductors must never be connected outside of main trap, or used as soil, waste, or vent pipes; nor shall any soil, waste, or vent pipe be used as a conductor. When connected with the house drain or sewer, the conductor shall be trapped beneath the ground with a deep seal, to avoid evaporation; and if placed within the house, shall be made of cast-iron, with leaded joints.

XVI.—*Steam Waste.*

No steam exhaust or waste from steam pipes shall be connected with any house drain or soil pipe.

XVII.—*Cesspools.*

No privy vault, or cesspool for sewage, will be permitted in any part of the city when a sewer is provided in front of the property lines, and no connection from any cesspool or privy well shall be made with any sewer or drain pipe.

XVIII.—*Cellar Drains.*

No opening will be allowed in the sewer pipe of any building for the purpose of receiving the surface drainage of the cellar, unless special permission is granted, and any opening so made must be immediately and permanently closed when directed by the Department.

Correspondence.

PLUMBERS' PROFITS.

WORCESTER, MASS., *March* 28, 1883.

To the Editor of THE SANITARY ENGINEER:

It is some time since I noticed any communication from this section in your paper in regard to plumbing matters. Thinking it might be of interest to your readers, I send the following:—

I am surprised to find among my customers, outside of professional men and members of the trade, such a large number of readers of your paper, and I think the plumbers owe, and should be willing to acknowledge, the improvement and high standard in our business to its influence.

During the hard times a large share of our business was done by contract, and generally through a second party, namely, the builder. In this way the owner rarely got what he expected. Sometimes he blamed the carpenter, but almost always he would claim that the fault was the plumber's. It was certainly very unsatisfactory all around, and I am glad to be able to say now that this manner of doing things is changing more and more every year, so that now if a party is going to build he has the plumbing left out of the carpenter's contract, and deals directly with the plumber. We also have a great deal more day work than formerly, and in remodelling all work is done by the day. This has become an important branch in our business, and, as I said before, it is due to the education of the public as to the importance of sanitary plumbing.

I hear of complaints in different sections that the plumbers can't get a profit on material. I never experienced any such difficulty here, and I would say to those who are making such a cry about protection, that the remedy lies with themselves, and that is, to stop trading with dealers who sell to consumers at wholesale prices.

E. A. MOODY.

[We are pleased to receive this testimony, and especially at a time when there are complaints that the plumbing business is getting demoralized. We shall be glad to get the views of others of our readers in various parts of the country on this subject, for we are under the impression that Mr. Moody's experience has been that of many other gentlemen in the plumbing business].

WINDOW VENTILATORS.

PACKET COLL. INST.,
BROOKLYN HEIGHTS, *March* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

One of the teachers of this institution has applied to me to know whether any improvements have recently been introduced in methods of continuous window ventilation. The method by introducing into the sash a revolving fan is of course familiar. Some one patented, a few years ago, a device for "filtering" the air which is permitted to pass through wire gauze at the base of a window, allowing a constant, gentle draft, free from dust, or by substituting muslin, free from moisture to some extent if the muslin be changed from time to time.

This latter method was introduced into one or two schools of New York City by joint recommendation of my friend. Dr. W. Gill Wylie (40 W. 40th st,) and myself. Dr. Wylie suggested to me yesterday to write you on the subject. If you can kindly refer me to any articles containing an account of further improvements, I shall esteem it a favor.

Very respectfully, yours,
W. LE CONTE STEVENS.
Acting Prof. Physics, Packer Institute.

[There are many devices for securing ventilation by windows without producing unpleasant draughts, the principal of all being the same—viz., to direct the incoming current of air upwards towards the ceiling by means of a deflecting plate. Wire gauze and coarse muslin are used in many of these contrivances, to keep out dust, flies, etc., and to break up the incoming air into fine streams, and thus avoid draughts.

The latest patents of this kind we have seen are that of J. G. Bronson (No. 270,733, dated Jan. 16, 1883), for an extra sash or deflector plate—and that of Sarah B. Stearns (No. 271,146, dated Jan. 23, 1883), for a deflecting plate with a gauze or cloth strainer. Copies of the specifications and drawings for these patents can readily be obtained from the patent office in Washington, or from this office.

The practical working of such contrivances depends on the mode in which the room is heated, on the presence of an open fireplace or special foul air flues, on the external temperature, and on the direction and force of the wind. As adjuncts to a properly arranged system of ventilation they are convenient and useful, but it is a mistake to rely upon them solely to secure ventilation in a room containing a number of persons, as, for example, in a school room.

Some additional particulars about simple means of window ventilation are given in the abstracts of Dr. Lincoln's paper on school houses in THE SANITARY ENGINEER, Vol. VI., p. 186, and by Dr. J. S. Billings, Vol., IV. p. 130.]

REMOVING VAPOR FROM DYE HOUSE.

HAMILTON, ONT., *March* 20, 1883.

To the Editor of THE SANITARY ENGINEER:

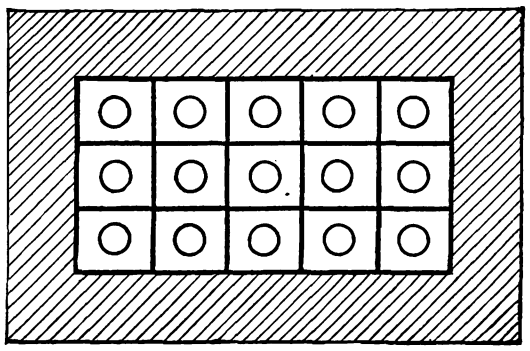
Could you inform me the best way to take steam out of a dye house? It is easy enough to do this in the summer by opening the windows and letting it blow out, but in the winter the cold air prevents it coming out.

It has been tried to draw it out with a fan, but it does not answer the purpose. The fan, of course, draws out the air, but leaves the vapor in the house. We have also tried to ventilate the steam through the roof by artificial heat, but with the same result as the fan. If you can get this information, or should any further information be required, if you will communicate with us by letter you will confer on me a very great favor. I am,

Yours respectfully, DONALD MCPHIE.

This is a dye house for a hat factory, and the steam is of a very wet nature, consequently like a vapor, and not like the ordinary steam from a boiler.

[We think a properly arranged fan would do more to remove the vapor from the room than any other means, excepting, perhaps, an aspirating shaft of large dimensions and high, with heating surfaces within the shaft, arranged with a view to getting the greatest results from the smallest quantity of heating surface.



In any case, provision must be made for admitting as much air, and as fast as the fan or aspirator is capable of drawing it out.

The air is the vehicle which holds the steam or vapor in suspension, and when the air becomes surcharged, the vapor being the lightest, the superabundance will be found near the ceiling, so that whether a shaft or fan be used, the air must be drawn from the top.

A way to remove moisture from the air of a drying room, without changing the air, is to condense it against pipes, placed at the upper part of the room, through which cold water is circulated.

Troughs are arranged under these pipes to receive the water so formed and conduct it without the house.

Professor Wm. P. Trowbridge, of Columbia College, in a paper read at the first regular meeting of 1882 of the American Society of Mechanical Engineers, says: "There seems to be no doubt that steam coils properly devised and adapted to chimneys or flues, will give a more efficient ventilation than the blower, for less cost of construction and maintenance." He also says: "The arrangement of the steam pipes in such a manner that the greatest amount of heat will be transfered to the air with the least resistance to its motion, is a matter of importance," and he suggests that a flue may be divided into smaller flues at its base with sheet iron diaphragms, between which the vertical pipes should be placed, as shown in the diagram.]

FIGURING AMOUNT OF HEATING SURFACE.

FLINT, MICH., *Jan.* 29, 1883.

To the Editor of THE SANITARY ENGINEER:

I have Baldwin's Steam Heating for Buildings, of 1881, published by J. Wiley & Son, but the rule on pages 23 and 24 I do not quite understand. If not too much trouble, will you please make it a little more explicit? For example, publish the figures and method of figuring on the following room, 19′ x 13½′ x 12′ ceiling; lath and plastered on brick wall, with 1½ furring between wall and laths. Three south windows, 3½ x 8 feet, or 28 square feet to each window. Same sized room with plaster on brick wall. The above will be kindly read.

Respectfully yours, F. C. H.

[You do not say how many outside walls there are to the room you specify; but as there are three windows, we assume the longest side (19 feet) to be the outside wall. The inner walls, ceilings and floors you may omit on the assumption the other rooms of the building are warmed. Thus we have 19 x 12 = 228, less the window's area (84 square feet) = 144 square feet of outside wall, which, multiplied by 75 and divided by 1,000 = $11\frac{8}{10}$, or the equivalent of the wall surface in square feet of glass for the lathed and plastered room, or the same (144) x 125 ÷ 1,000 = 18 for the unlathed.

Thus we have in the first case $84 + 11\frac{8}{10} = 95\frac{8}{10} \times .5 =$ 47.9 square feet of radiating surface for the first room, and 84 + 18 = 102 x ½ = 51 square feet for the second room; to both of which should be added a generous allowance of surface to warm the air admitted for ventilation or leakage, if any.]

APPARATUS FOR EMPTYING CESSPOOLS.

NEW YORK, *March* 27, 1883.

To the Editor of THE SANITARY ENGINEER:

Can you tell me where I may get a pneumatic cart or "excavator" for emptying country cesspools, and sprinkling sewage in fields? Yours faithfully,

C. R. AGNEW.

[We refer this inquiry to our readers.]

WATER IN BOILERS.

ST. LOUIS, *March* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

What would be the condition of the water in a boiler used continuously, over and over, without any new water being added, said boiler being used for a gravity return heating apparatus? Would it be dangerous?

No. 1,925 Olive st. A. H. GOFF.

[We do not understand what danger you particularly refer to. The only salt deposited to any extent in the boiler would be carbonate of lime, for there would always be enough water in the boiler to hold the soluble salts in solution. The water returning from the radiators is practically distilled water, and contains no salts.

HOT WATER RADIATOR.

ST. JOHN, N. B., *March* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Do you know of a hot water radiator for use in private dwellings, in place of box coils for house heating by hot water? If so, kindly inform us. In your issue of May 4, 1882, the description of the hot water apparatus of J. H. Baldwin, M. D., is very incomplete, and the form or style of apparatus such as we would not care to construct.

Hot water heating is largely used in our city, and has proved highly satisfactory and very economical of fuel. We construct a low pressure hot water heating apparatus, open to the atmosphere, for private dwellings, and must say we prefer it to steam for that purpose, although we put in low pressure steam gravity apparatus, working at one-inch pressure, also. But the universal opinion here is in favor of hot water for private residences, and steam for large buildings, schools, public halls, etc.

Yours very truly, J. A. FISH,
41 Dock street.

[Some of our readers can doubtless give Mr. Fish the desired information.]

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74 St. Mary's St., Toronto, Can., *March* 17, 1883.

To the Editor of The Sanitary Engineer:

I would like to draw your attention to one or two points which I noticed in late numbers of The Sanitary Engineer, which appeared to me to be slight errors, viz—on page 221 of the issue of Feb. 8, there is a note of the City of Birmingham Eng., taking proceeding against certain towns above it on the River Thames (?) etc, etc,.

If the town *is* Birmingham the river can hardly be the Thames, as the Thames rises in the Cobswolds Hills, about 60 miles due south of Birmingham, flowing for some miles southeast and then east; the Cobswolds Hills and the River Avon lying between Birmingham and the Thames.

Then in the issue of Feb. 22, on page 274, note "Regina, N. S." (?) Regina is in the N. W. T. of Canada, being the capital of the new province of Assiniboin in the North West Territory.

In the same issue, on page 269, is an illustration showing the plumbing of a London residence, is not the position of the vent pipe from the W. C. under street totally inadmissable? through its being connected with the vent pipe of the main trap on the sewer, or street side of trap, and thus bringing the sewer gas of main sewer into direct connection with the house system of drains!

My experience of plumbing and drainage in England is, that it is the very rare exception to find these vent pipes from crown of traps, and I think the by-laws of the various cities will bear me out in this, not excepting "the model by laws" issued by the Local Government Board.

Yours faithfully,

J. Hargrove Rainey, *Assoc. S. Ind. Eng.*

[We published the illustration just as we received it, and did not notice the pipe referred to which if joined, as seems to be the case, is open to the objection pointed out by our correspondent.]

AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

[One of the last labors of the late Robert Briggs was the preparation of a paper on the history and progress of steam heating in the United States, for the English Institution of Civil Engineers. The paper was read after the author's death, at the meeting held November 28, 1882, and has peculiar interest from his almost unrivalled acquaintance with the development of steam heating in this country.

We shall publish full extracts of the paper.]

The application of steam to the warming of buildings in the United States originated with the late Mr. Joseph Nason, of Boston and New York, who died six or seven years ago. He was not only the first to make the attempt, but was also the originator, improver and adapter of much that is essential, and now implicitly followed, in the general arrangements and details of the apparatus employed. He enjoyed the advantage of having been for a short time a pupil of Jacob Perkins in London, about 1840; and his earliest endeavor in America was to adapt the Perkins system of hot water inside small tubes for meeting the severity of the climate of America. The large extent of warming surface and the great strength presented by steam apparatus constructed of small and comparatively inexpensive wrought iron tubes, and the facility thereby afforded for transmitting heat in any direction from a central source, are merits which led to so rapid a development of this system of warming, that by 1860, or in less than twenty years, there were already many hundred establishments throughout America for the manufacture of the apparatus. With the maturing of the system are associated the names of Mr. J. J. Walworth, of Boston, brother-in-law and partner of Mr. Nason; Mr. Gregg, of New York; Mr. J. O. Morse, of New York, by whom, among other improvements, was introduced the method of closed circulation for working with steam below atmospheric pressure; Professor Mapes, of New York, who supplied a reliable steam trap; Mr. Miles Greenwood, of Cincinnati, to whom the author believes the arrangement is due of a coil or nest of tubes connected by return bends; and Mr. Thomas T. Tasker, of Philadelphia, who introduced the first closed apparatus. For himself, the author may claim to have established certain characteristic shapes and dimensions now universally adopted for the "globe" stop-valves and for the fittings or couplings of the tubes.

Wrought-Iron Welded Tubes.—In the construction of the apparatus for warming by steam, the prevailing practice in America is to employ wrought-iron welded tubes, not only for the mains, but also to a large extent for the radiating surfaces that diffuse the heat. The separate lengths of tubes are connected by wrought-iron couplings, when in the same straight line; and when not so, by cast-iron elbows, tees, branch-pieces, and return-bends. The so-called coils or radiators usually employed for diffusing the heat are compact nests of tubes, sometimes arranged vertically by having their bottom ends screwed into a cast-iron box, and at other times placed horizontally and connected together by branch-tees and return-bends.

In the use of these tubes, the essential feature of practical importance is the employment of tapering screw-threads, externally upon the tube ends and internally within the sockets of the couplings or fittings, as the means of securing durable steam-tight joints which can be readily made or unmade. The system of taper screw-threads for the tube connections is believed by the author to have been originated by Mr. Nason, with whom he became associated in 1846; at that time the threads were cut in a lathe.

Where any two metallic surfaces are to form a steam-tight joint, they must be brought together into complete contact, either with each other or with some elastic or yielding packing interposed between them; and the force compressing them together must be sufficient both to obliterate any inequalities in the surfaces themselves, and also to withstand any internal pressure tending to part them. In the case of the machine-finished surfaces of the external and internal taper screw-threads forming the tube joints, the required contact is no doubt mainly affected by yielding of the metal of the tube under compression of the socket under tension; while the thread itself serves to maintain the joint against the internal disruptive steam-pressure.

A screw-thread, either external or internal, cut or tapped by means of the usual workshop appliances, is far from possessing absolute accuracy in radius, either for the top of the thread or for the bottom of the groove; and presents also the defect known as "drunkenness," or want of uniformity in its inclination or pitch. In making a steam-tight joint, these imperfections have to be overcome by the application of force. The thread has also defects in angular form, arising from imperfections in the dies or taps, and from the metal having been torn instead of being cut clean in the formation of the thread. These defects are remedied by the use of a paste, made of white lead ground in linseed oil and mixed with about an equal quantity of dry red lead. This material acts both as lubricant and as packing in making the joint; it fills all interstices in screwing the joint up, and sets hard on the first application of steam heat, or within a short time if left cold.

The leverage of the pipe-tongs or wrench, employed to screw the tube up, is largely multiplied by the action of the screw itself in converting the force into the longitudinal direction; and the tube end being moreover shaped as a conical plug of slight taper, the longitudinal force results in a greatly intensified pressure of contact between the threads of the tube and its socket. For example: the ordinary pitch is 11½ threads per inch for a tube of one inch nominal diameter inside or 1.31 inch actual diameter outside, and the taper of both the tube end and the inside of the socket is one in 32 to their axis. After the tube has been entered into the socket as far as it can readily be screwed up by hand, one quarter turn more with the pipe-tongs is generally sufficient to make the joint steam-tight. In this quarter turn of the tube the difference of diameter is in the ratio of one, 11½x16x4, and is therefore equal to 1-736th of an inch. Meanwhile the hand, acting on the tongs at a radius of usually about 16 inches, will move through an arc of 25 inches, giving thus an effective leverage of say 18,000 times. The bursting pressure thereby produced within the socket, or the compression upon the tube end, is concentrated on about one-half inch length of the socket or tube, and the mean diameter is there about 1¼ inch; whence the pressure per square inch tending to burst the socket is roughly about 11,000 times the manual force exerted on the tongs, if the frictional resistance to turning be neglected.

In practice it is really by the frictional resistance to turning that the limit of bursting strain actually thrown upon the cast-iron socket in screwing up is determined. For supposing the limit be taken to be a radial pressure of say 5,000 lbs. per square inch, it is seen from the foregoing that, after overcoming the frictional resistance to turning, an insignificent one-half pound would be all the extra force required on the pipe-tongs for throwing this great bursting strain upon the socket. Allow now 15 per cent. as the co-efficient of friction—a value not unreasonable when it is borne in mind that points of metal are brought into contact, and that the great pressure between them destroys the continuity of the imperfect lubricant. Then neglecting the screw-thread, and regarding the tube end and the casting as a plain conical plug and corresponding socket, the resistance to turning, offered by the one-half inch length of tube-end of 1¼ inch diameter is 5,000 x 0.15 x 3.1416 x 1¼ x ½ = 1,400 lbs., acting at a radius of ⅝ inch, which is equivalent to about 55 pounds exerted on the handle of the tongs of 16 inches radius. A skilled workman judiciously keeps well within this limit in the force which he exerts; and the cast-iron fittings being made according to the proportions hereafter given, the thickness of metal left outside the thread after tapping them is amply sufficient to stand the tensile strain so exerted, which rises probably to 10,000 or 12,000 pounds, say five tons per square inch of section of metal. In practice, moreover, it is found that a joint can safely be screwed up with the tongs through even one whole turn, instead of only a quarter turn; the wrought-iron tube-end yields permanently under the compression, while the limit of elasticity of the cast-iron socket is not exceeded, and hence neither metal has its strength impaired. Complete facility is thus afforded for leading off bends or branches in any desired angular position,

[To be Continued.]

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
March 31....	28.15	19.74	22.19	28.77	29 69	19.03

E. G. LOVE, Ph.D., *Gas Examiner.*

"A VALUABLE DISINFECTANT FOR SEWERS."

Under this heading the *Water Gas Journal* says:—

"It has been discovered that the best disinfectant for sewer gases is the washings from gas works. This serves a double purpose, that of annulling the poisonous effect of the sewer gas, and at the same time enabling persons having defective traps to detect it by the strong, pungent odor arising therefrom, while sewer gas alone, almost odorless, permeates the building, carrying sickness and death with it. The washings from water gas works, at least, will not clog or obstruct even the smallest of sewers, while their presence, as above stated, might save valuable life."

We cannot endorse these views, for several reasons. We are somewhat in doubt as to what is meant by "washings from gas works," but it is reasonable to suppose that it includes all the liquid refuse matter, tar, ammoniacal liquor, etc.

1st. The liquid refuse from gas works would not disinfect sewer gases. Their odor might be partially or entirely disguised, but this is a long way from disinfection. To be sure, if a disease germ were well soaked in ammoniacal liquor, or thoroughly smeared with coal tar, its future usefulness would be very seriously impaired; but no such desirable end would be reached by letting this refuse flow into the sewers. The difficulty is in bringing the germ in actual contact with the so-called disinfectant.

2d. The tar would most certainly obstruct the sewers, although the ammoniacal liquor might not. The tar would settle and mix with the other refuse washed in from the street, not materially improving the job of the person who, from time to time, is obliged to shovel it out.

3d. The tar and liquor are too valuable to be thrown away. The latter yields valuable ammonia salts, while the former is the source of our most important dyes. Together they can be made to pay a considerable portion of the cost of the material used in the manufacture of gas.

L.

THE STORAGE OF ELECTRICAL ENERGY.

Professor George F. Barker, of the University of Pennsylvania, delivered a highly entertaining lecture on the above subject last Friday evening, before the Chemical Society of the School of Mines, Columbia College. Besides the members of the society and other students and professors of the school and college, there were present representatives from the principal electric light companies, and many others interested in electrical science. Long before the beginning of the lecture all the seats were taken and many stood throughout the whole two hours, or more, in which the lecturer entertained his audience.

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The magic lantern was used to illustrate forms of apparatus not at hand, and to show experiments, which otherwise the whole audience could not have seen. From the centre of the ceiling hung a handsome electrolier of novel pattern, with peculiar shades of colored glass, loaned by Mr. Edison. The six Edison lamps which it contained were supplied with current from a Faure storage battery of 28 cells, loaned by the Light and Force Company. These lamps furnished the entire illumination for the room.

The first part of the lecture was a review of the progress of the knowledge of electricity since the earliest experiments of Galvani and Volta. In commencing the subject proper of his lecture he began at the first principles of mechanics, and defined and illustrated by means of specially arranged apparatus, the meaning of "work" and its mechanical measure and "energy," both of motion and position. Storage of energy was defined to be "the conferring upon a body the power to do work in virtue of a change in its position" and "whenever two attractive bodies are separated, energy is stored up." The speaker would not like to have the subject of his lecture reported as "the storage of electricity," as it had been announced. It was not electricity that was stored up in these cells, but energy. "If I use a steam engine" (to lift a weight which he had raised) "I should not say I had stored up steam power, or if I use the muscle of my arm, I do not store up muscle. What I have stored up is energy, and energy is all you can store up."

Chemical decomposition by means of the electric current was illustrated, and polarization explained as the basis of the principles of the storage battery. Planté constructed secondary batteries thirty years ago. They consisted of cells of lead plates in a solution of one part of sulphuric acid to ten parts of water. The result is a growth of lead oxide on the positive plate and metalic lead on the negative, the product of chemical decomposition. By this means electrical energy is stored up, and is given out on chemical re-union. The more recent discoveries of Faure have given an improvement on this method. He found that instead of waiting for the formation of the peroxide of lead it could be placed beforehand on the plates, thus shortening the time required for the storage of a secondary battery from three months to a hundred hours. Specimens of the plates were shown. The red lead was kept on the plates, after being spread over them, by parchment covered with felt, and the plates afterwards punctured with holes about an eighth of an inch in diameter and half an inch apart.

Electrical energy could not be stored without loss, for no human machine was perfect. Still the storage battery had its place and was destined to come into very general use.

One of the exhibits which seemed most to interest the audience was that of a little lamp designed to be used at the Vandebilt ball in the head-dress of a lady. It was not used because it was found when too late that the resistance of the lamp was too great for the little battery. Three of the latter were connected with perfect success with one lamp, which continued to blaze till the close of the lecture. Other curiosities shown were one of the original plates brought over from France in the Labrador, and a piece of Benjamin Franklin's apparatus, belonging to the University of Pennsylvania.

DANGEROUS DAMPERS.

The *Times* of Hamilton, Ont., gives the details of a very sad case of suffocation by gas from a coal stove. The stove was a small self-feeder, without any inner lid to the cover, and the pipe was provided with a very common but abominable contrivance called a damper. It appears that when discovered by the neighbors the mother and one child were already dead, and the father very nearly so. The only cover which the stove had was found partly off, the damper was closed, and, as a consequence, all the gases from the burning coal escaped into the room. In this particular case the accident might have happened even without any damper in the pipe, although a portion of the gases might have found an outlet through the proper channel had it not been obstructed. There are cases enough, however, in which the damper has caused serious accidents to warrant its emphatic condemnation. In the first place, the idea of controlling combustion by placing a check in the outlet pipe is entirely wrong. The products of combustion should be allowed to escape into the chimney without any hindrance. If the fire burns too fast it should be controlled by regulating the air supply by means of the draft, and any stove in which this cannot be done is not fit for domestic use.

ELECTRIC LIGHT NOTES.

The trustees of Cornell University, at Ithaca, have authorized the establishment of a course in electrical engineering.

At Hartford, the 28th ult., arrangements were made by which the American Electric Light Company of Boston is to acquire a controlling interest in the Hartford Electric Light Company.

The Chicago Sectional Electric Underground Company have now completed one mile of conduit, the depth below the surface averaging two feet (four feet when street is filled). There are two cables containing each 40 copper wires, insulated.

The Edison Electric Illuminating Company of Boston was organized March 28. Capital $1,000,000. Directors, A. Tower, Theodore Dean, Charles Babbidge, George P. Denny, R. P. Hallowell and W. L. Garrison; clerk and treasurer, W. L. Garrison; general manager, C. D. Stickney.

The Western Union Telegraph Building, at the corner of Broadway and Dey street, this city, is about to be lighted from the Edison Central Station. It is being wired for 345 lamps, though at present but 255 are to be used. These are distributed as follows: Associated press room, 55; operating room, 107; ground floor, 55; halls, 8; first and second floor, of No. 8 Dey street, 15 each.

A temporary injunction was granted March 28 against the Maxim Electric Light and Power Company of Philadelphia, restraining them from erecting poles on Delaware avenue. The application for injunction was made by counsel for the city of Philadelphia, as trustee under the will of Stephen Girard, on the ground that the city has no power to grant a franchise for this part of Delaware avenue, except as trustee.

A committee, under auspices of the Society of Telegraph Engineers and Electricians, will arrange the British Section at the Electrical Exhibition, at Vienna, which opens in August. The Crown Prince Rudolph is patron of the enterprise. English correspondents state that one of the principal features will be the exhibits of M. Marcel Deprez for the transmission of power by electricity.

A circular issued by the Treasury Department in regard to the electrical exhibition to be held by the Franklin Institute, at Philadelphia, states that "articles arriving at the ports of Boston, New York or Baltimore, destined for the exhibition of 1883 or 1884, may be shipped by bonded common carriers from the port of first arrival to Philadelphia. On arrival at Philadelphia they will be taken possession of by the collector of customs, and an entry for warehouse in the usual manner will be required, after the bonding of the exhibition building, whereupon an appraisement will be made and the rate and amount of the duties determined. Storage of the merchandise will be permitted in a portion of the building, duly bonded. Goods withdrawn for consumption on payment of duties, after one year from the date of their importation, will be subject to an additional duty of 10 per centum of the duties otherwise accuring.

Mayor Edson has vetoed the resolution passed by the Aldermen of this city, as noticed in our issue of March 22, permitting the New York Electric Lines Company to lay wires in or through the streets. He says, "the right to use the public streets for purposes which involve the tearing up of pavements, excavations in the streets, and the subsequent obstruction of crowded thoroughfares, should be granted only when great public benefits are to be realized. It appears from such investigation as I have been able to make, that this company at present exists only on paper, and its further development depends upon its obtaining the right to lay wires under the streets of New York and Brooklyn, which it proposes to lease for electrical purposes, and that from these sources alone the revenue of the company is to be derived."

DRAIN TESTING IN GLASGOW.

The following interesting report on the testing of house drains is one of the strongest arguments in favor of official supervision of plumbing that we have seen. In our Novelty column we describe a machine for making the smoke test; whether it is the one used in Glasgow or not we do not know, but that is probably something of this character.

Mr. Kenneth Macleod, the sanitary inspector, on drain testing for the year ending February 20, 1883, reports to the Health Committee as follows:—"I beg to report that, during the year ending on 20th February last, the drainage systems of 236 properties were tested by the smoke injector, with the following results—viz., 229 of these were found more or less defective, permitting the escape of sewer air into the dwellings, and only 7 were found thoroughly tight and efficient. This being the first report, it will be necessary for your information to go further into detail than may be required in those that will be submitted hereafter. The defects consisted of 46 drains untrapped, 95 unventilated, 6 with open ends, 79 open at their junction with soil-pipes, 50 open at their junction with water-closets, 12 had their piping partly broken, 146 had defective joinings along their course, and 6 were choked. Of the soil-pipes, 14 were found unventilated, 30 perforated by corrosion, 2 holed by rats, and 65 badly jointed. One water-closet, 1 jawbox, and 6 internal surface gratings were untrapped, 18 traps were found ineffective by malformation, 3 traps unlocked by suction, and 2 standing waste-pipes of water cisterns joined to soil-pipe had no protecting seal. From the foregoing it may be safely concluded that the defects are chiefly due to imperfect workmanship in the original construction of the drains and their connections, teaching in the very clearest possible way the urgent necessity that exists, not only for special supervision over every newly-constructed system, but the prohibition of its use till thoroughly tested and certified safe and complete by a competent officer specially appointed for that purpose. The gross number of properties operated upon may be classified as follows:—1st, 66 self-contained dwellings; 2d, 69 tenements of flatted houses, rented at £30 and upwards; and 3d, 101 under that rent, including six, five, four, three, two, and one apartment dwellings. The drains of the first and second class were, with one exception in the first class, found defective. The other six efficient drains were found amongst the third class, and, as they form such an extremely small percentage of the whole number tested, deserve to be recorded. They are as follows, viz:—66 Trongate, 16 Moir Street, 6 Albany Place, 35 Ronald street, 10 Steven street, 40 Grove street, 15 Abbotsford Place. Generally two tests were applied in each case—the first to find out the points of leakage, and the second to prove the efficiency of the required repairs—but in 38 cases it was found necessary to make three applications of the test, in 13 cases four, and in two cases five, before certificates of efficiency could be granted. Our attention was drawn to these properties by cases of infectious diseases found in them by our officers; from complaints by the tenants of offensive smells arising in their dwellings; and by special request of the owners themselves. The tests are carried out by a smoke test operator on our part, aided by a plumber and mason employed by the owner of each property on their part. The improvements effected have given the greatest satisfaction, and generally owners, when asked for permission to apply the test, are most willing to co-operate to a satisfactory conclusion. The great necessity thus shown for rigorous action in this most valuable and life-saving service, and the desirability of making it widely known to the citizens, leads me to suggest that the most extensive publicity should be given to the fact of its being placed freely at their disposal."

NOTES FROM CHICAGO.

(From our Special Correspondent.)

CHICAGO, ILL., *March* 29, 1883.

Whichever way the local political cat, now crouched low, shall jump, Chicago streets are sure to be the cleaner. The war cry of the Opposition, comprising Republicans, Independents, and many Democrats, has been "Clean streets!" all through the fierce two weeks' campaign, and the renomination for Mayor, yesterday, of the present incumbent, was signalized this morning by a double-sized broom brigade hacking away at the heaped piles of snow and mud. Until election morning, at least, no hands with strength enough to raise a hoe need be idle, and in the contention of parties, sanitary interests will have achieved a substantial victory before these words are read. The victory promises, too, to be more than short-lived, as "through the influence of the administration," (as is heatedly claimed) the appropriation just passed for street cleaning—$180,000—is considerably greater than for any preceding year.

Next to politics the city is given over to experiments—and preparations to experiment—in underground electric systems, and the way in which alleys are being torn up and side walks tunneled is unprecedented.

"I hear of one hundred separate and distinct movements" said an electrician, interviewed for THE SANITARY ENGINEER, yesterday, "to put down sidewalk conduits, and so gobble up the immense prospective business that is expected to come by May Day, when, as these shrewd contractors know, the hundreds of wires of the Western

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Union Telegraph Company are going to be snipped, like the Mutual Union wires, a month ago, unless our Lord Mayor consents to a compromise and delay."

"There is this difference, however," your correspondent remarked, "that the Mutual Union formally, by charter, agreed on March 1, as the date when all their wires should be underground, whereas, in the case of the Western Union, the date (May 1) has simply been fixed by Council ordinance, the company never having agreed to it."

That is true; and the result, now that Mayor Harrison has shown his hand, will no doubt be a writ of injunction, a safe way in advance of May Day, and no end of litigation, with a good prospect that the wires will continue to veil the face of Chicago and mother earth with their steel lace work for an indefinite time to come.

All the same, the projectors of the underground schemes are busy as ferrets; three new charters were asked of the Council committee at its last session, one being favorably reported, and the advertisements of official tests to be made fill daily space in the papers. The nearest at hand of these examinations will be next Tuesday, the line to be inspected being a mile on Wentworth avenue, from the city limits north. The devices and methods of construction are of all kinds, and, if for no other reason, too technical for enlargement here. The fact that Professor Elisha Gray, an electrician known everywhere, predicts a unique success for one system, awakens considerable interest in the coming test.

In the meantime—and the concession shows a conciliatory disposition in the Council—temporary authority was granted at the session Monday night to string an "aerial cable" like those operated in New York for a year (as also in this city for some months across a single street to the Chamber of Commerce), and already the Western Union has half a mile well under construction.

Three nights ago the annual appropriation bill passed the Council, and contains provisions more ample than usual for sanitary purposes and public works in Chicago. The Health Department secures $108,405, with several extra sanitary police. Besides the sum already named for street cleaning, there is $170,523 for street improvement; and other prominent amounts are $60,000 for viaduct construction; $55,000 for canal pumping works; $42,000 for bridge construction and repairs; $23,000 for the harbor; $20,000 for Fullerton avenue conduit; $12,000 for Washington street and LaSalle street tunnels—altogether $537,549 for the Department of Public Works. The whole bill appropriates a little over four and a half million of dollars.

Regarding the new west side pumping works, provided for in last year's appropriations, Commissioner of Public Works Cregier, who has just returned from New York, says that the necessary casting will be finished and shipped here in a month or two, and the pumps will be supplying the hydrants of citizens by September 1.

The Illinois Central Railroad Co. have offered a site for the new morgue at the foot of Randolph street, and the plan is favored, the revised estimate of cost being $15,000.

Repairs will at once commence on the Union Club's elegant house at Dearborn avenue and Worthington Park, damaged $80,000 by fire Monday night, on the eve of occupation, the restoration requiring till September 1. Significantly, the night watch has been doubled at the Calumet Club's still more handsome new home, at Michigan avenue and Twenty-first street, also on the point of occupation.

All over the city there is marked activity in building preparation, the monthly permits exceeding considerably those of any preceding March, and in consequence the architects, the contractors, the plumbers, are wearing smiles, meet to welcome the advent of "sweet spring."

Cincinnati has never had a morgue. The stable loft of the City Undertaker's establishment has thus far been the only temporary depository of those who have suddenly died. During the heated term of two years ago, when so many died from sun stroke, the sight presented in this excuse for a morgue was disgraceful to a city of this size. Now, however, there is some prospect of having one with the ordinary facilities. A bill is pending to appropriate $20,000 for the construction of a building in the jail yard. There is some disagreement in regard to the location, but the city is likely to have a morgue at last, at some convenient point.

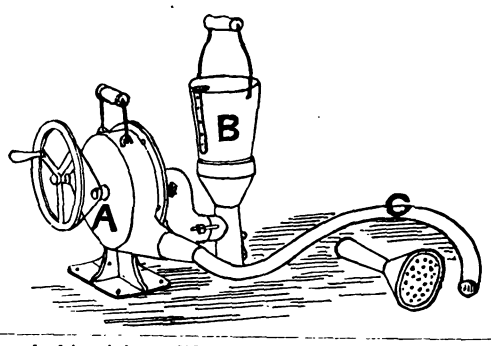
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

MACHINE FOR APPLYING THE SMOKE TEST.

English exchanges frequently allude to the "smoke test" for drains. The following sketch is reproduced from a circular that came under our notice, which we thought might be a novelty to many of our readers.

No adequate description of the method of operation accompanied the sketch. An examination of it would indicate that the practice is to place some burning material in pail *B*; the turning of the wheel revolves a fan in shell *A*. This drives the smoke through the hose *C* into the drain at some point near its lower extremity, and it will find an exit



at any leaking joint. We presume the open end of the soil pipes are temporarily closed. It would seem that an apparatus of this character might prove very useful in testing soil pipes. If we have not properly explained the machine and the method of using it, we trust some of our English readers will correct us.

The machine, which is called an asphyxiator, is made by John Watts & Co., Bristol, England.

Construction Notes.

WILMINGTON, DEL.—The State Senate have passed a bill authorizing Wilmington to borrow $180,000, to be applied as follows: Not more than $60,000 for the purchase of water rights in the south long race; not more than $50,000 for the establishment of a pumping station on the brandy wine above the manufactories thereon, or if that be not practicable, for the erection of new steam pump at the City Mill; not more than $16,000 for building sewers to carry off the water of Crooked and Rattlesnake runs; not more than $16,000 for enlarging the Rodney street reservoir; not more than $16,000 for laying new mains on Jackson street from Second to Eleventh street, and on Eleventh street from Jefferson to Market street; not more than $11,000 for laying a submerged main under the Christiana River at Market street; not more than $11,000 for building a suplementary reservoir near the Cool Spring Reservoir and for improving the ground thereof.

WASHINGTON, D. C.—Major Thomas P. Morgan, has been awarded the contract for dredging along the proposed sea-wall of the Potomac flats. His bid was 7 cents per cubic yard at the foundation for the slope of the wall and 14 cents per cubic yard between the wall and the five-foot curb.

HYDE PARK, ILL.—Bids for laying the water-main from the water-works to South Chicago have been opened. The work was awarded to Messrs. Dolese & Shepard at 85 cts. per lineal foot. Following is a list of the bids received: M. Clarkson, $1.34 per foot; Robinson & Miner, $1.21 per foot; Ritchie & McNicholl, $1.06 per foot; C. S. Baker, $1.05 per foot, McIntosh, McDonald & Conboy, $1 per foot; McNicholl & King, 92 cents per foot, and Dolese & Shepard, 85 cents per foot.

EVANSTON, ILL.—It is believed that the next Board of Trustees will favor the construction of a sewer for draining low land west of the village, estimated cost $50,000. The scheme provokes strong opposition, and a protest is made in a local paper against voting for any candidate who favors it.

SHARON, MASS.—A bill has been reported in the State Legislature incorporating the Sharon Water Company. Capital $75,000.

LYNN, MASS.—The Water Board decided, March 20, to buy a new steam pump. Cost $6,800.

WORCESTER, MASS.—The Boston *Herald's* legislative report states that the Judiciary Committee reported on the 20th ult. that it was inexpedient to legislate on the petition of the Mayor of Worcester for legislation authorizing the city to enter into contracts with the owners of water rights affected by the taking of Tatnuck brook to supply them with water in lieu of damages.

ROANOKE, VA.—The City Council adopted the system of sewerage which was proposed by Mr. Rudolph Hering, C.E., at their meeting March 1. The cost of the work is set at $29,962.

PHILADELPHIA.—The filthy condition of the streets has so disgusted some of the private citizens and firms of the city that they are having the streets in the neighborhood of their homes and places of business cleaned at their own expense, A. J. Drexel, the banker, and Geo. W. Childs, of the *Ledger*, began the good work by having Chestnut street cleaned from the Delaware to the Schuylkill rivers.

CHICAGO.—March 26 the Commissioner of Public Works opened the following proposals to construct the sub-structure of the Ashland avenue bridge: Sooy Smith & Son, $9,824; Harvey Fox & Co., $9,900; Chicago Dredging and Dock Co., $11,600.

The canal lock at the Bridgeport Pumping Works is now above water line, making navigation possible, although the contractor demures against opening the lock for a month yet (till May 1), unless the canal commissioners will guarantee him against any damage to the fresh masonry.

Superintendent Cheney has prepared estimates of the cost of a sewer on Kedzie avenue in a section of the city which has suffered much from inundation. The *Tribune*, state a 4½ ft. sewer is contemplated, cost $60,000. Also an extension of the sewer in 22d street will be requested of Council, cost $63,000.

NEW YORK.—The following lowest bids were opened at the Department of Docks on the 28th ult.: For building a crib bulkhead and platform at the foot of 75th street, East River, Richard Cronin, $1,700. For repairing the understructure of new pier No. 42, North River, Wm. P. Kelly, $1,819. For repairing pier 52, E. R., Richard Cronin, $2 875. For repairing the small pier between piers 51 and 52, at Gouverneur Slip, E. R., John Gillies, $887.

LOCAL WATER SUPPLIES.—Bills incorporating water companies have been reported in the Massachusetts legislature for the following towns: Attleboro Water Company, capital not to exceed $100,000; East Weymouth Water Company, capital not to exceed $100,000. Bills have also been reported for supplying Wellesley with water, issue of bonds not to exceed $50,000 for water supply of North Adams, and to authorize Natick to supply Wellesley with water. A petition was received for incorporation of a company to supply Franklin with water. A bill has also been reported to permit Nahant to supply drinking water from any water sources belonging to the town.

A bill was introduced in the New York Assembly last week providing for a survey of State lands in Clinton, Essex, Franklin, Fulton, Hamilton, Herkimer, Lewis, Saratoga, St. Lawrence, and Warren Counties, and for the preservation of forests, and for the storage of the waters of the upper Hudson and adjacent streams. $15,000 is to be appropriated for purposes of the survey.

PHILADELPHIA.—The following bids have been received for furnishing lead pipe of various sizes for the gas works:

Nathan Trotter	$6.07 per cwt.
Gummey, Spering, Ingram & Co.	6.07½ "
P. C. DeSacque	6.75 "
Paul J. Field	6.07 "
Tatham Brothers	6.75 "

Bids for furnishing lamps were also opened as follows:

Elkins Manufacturing Company	$2.85 per lamp,
Globe Tin Co.	$3.15 and 3.40 "
John M. Malloy & Son	3.00 "
John Neuman	3.65 "

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The Committee on Distribution of the Philadelphia Gas Works, W. H. Smith, Chairman, opened bids on March 27, for furnishing pig lead, pig tin and lead pipe. The bids were as follows:

For 80 tons, more or less, of pig lead, Omaha, Newark, or Silver brand :—

Hall & Carpenter	$4.08	per cwt.
Nathan Trotter	4.78	"
Gummey, Spering, Ingram & Co	4.79	"
P. C. DeSacque	4.71	"
Paul J. Field	4.78	"
Tatham Brothers	4.69	"

For 6 pigs block tin :—

Nathan Trotter	22½c.	per lb.
Gummey, Spering & Co	23½c.	"
P. C. DeSacque	21⅞c.	"
Paul J. Field	22½c.	"
Tatham Brothers	21¾c.	"

GOVERNMENT CONTRACTS, TREASURY DEPARTMENT.

Custom House and Post Office, Toledo, Ohio, for cut and stone superstructure. Opened March 29, 1883:

Bidder.	*Amonnt.*	*Kind of Stoue.*	*Time.*	*Remarks.*
Isaac Grandson	$63,500.00	Bedford,	8 mos.	Informal.
" "	66,500.00	"		
Andrew Dall, Jr.	69,129.00	Buff Amherst,	12 mos.	
Jacob Vehmeyer	65,800.00	"	420 days.	
" "	69,350.00	Bedford,	420 days.	
Albert Newkom	58,900.00	Amherst,	12 mos.	
Rees Evans	95,750.00	Bedford,	15 mos.	
"	92,300.00	Amherst,	15 mos.	
M. A. McGowan	66,700.00	Bedford,	12 mos.	
"	67,000 00	Amherst,	12 mos.	
Tomlinson & Reed	71,000.00	Bedford.		
Ind. Oolitic Lime Co.	68,848.00	Bedford,	18 mos.	
Blatz, Krebs & Co	64,940.00	"	225 days.	

Abstract of bids for down spouts for new Pension Building:

E. J. Hannan	$1,148.80
Haywood & Hutchinson	560.10
Wm. Rothwell	463.92
Jno. Logan	788.00
M. J. C. Brien	815.00
R. G. Campbell	976.00
	618.00
Edward O'Hare	800.00
	482.00
Thomas W. Miller & Co	899 00
Jas. Reagan	573.60
J. T. Brien	575.30

Custom House and Post Office, Memphis, Tenn. For slating of roof, March 29, 1883:

A. J. Harris, plain work	$15.00 per sq. yd.
" fancy work	18.00 "
D. F. & T. D. Hayden	$1,665.00
Kinsley & Muller	1,523.00

Custom House and Post Office, Paducah, Ky. Bids for hardware, March 27th:

Hopkins & Dickinson	$895.63
P. & F. Corbin	870.52

Custom House and Post Office at Philadelphia, Penn, For marble mantels, opened March 27, 1883:

Robert C. Fisher	$16,365.00	6 mos. time.
Davidson & Sons	11,463 00	4 "
H. Klaber	19,620.00	5 "
Mathew Schmidt	9,899.00	5 "
Chas. E. Hall & Co.	11,717.60	

PLUMBING LAW VIOLATION.

But six violations of the plumbing regulations were reported to the Health Department of this city last week—three each by Inspectors Hooper and Dickinson. Most were of a trivial nature.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

182 Eldridge st, one br ten; cost $17,000; o, Ph. Braender; a, Jno. Brandt...101-103 Thompson st, one br factory; cost $35,000; o, Amos R. Eno; a, D. W. Willard .. 2d av, s w cor 9th st, one br ten; cost $30,000; o, Chas. Lindner; a, Wm. Jose....124, 126, 128 and 130 w 39th st, two br ten; cost each, $40,000; o, Sarah A. Sanches; a, M. C. Merritt....322 35th st, E, one br and b st ten; cost $14,000; o, James Kyle ...550-552 W. 38th st, one br factory; cost $16,000; o, Mary Cable; a, R. Cable ...121, 123, 125 and 127 W. 39th st, one br and Belleville st ten; cost $140,000; o, James D. Fish; a, E. H. Kendall ... 1418 Broadway, e s, 76.10 n 39th st, one br and Belleville st ten; cost $40,000; o, same as last....31-33 57th st, two Bedford, Ind., st dwel; cost each, $125,000 and $90,000; o, Jacob Rothchild; a, Youngs & Campbell .. 62 Madison av, e s, n 50th st, rear, two Bellville b st dwel; cost $50,000; o, Henry Villard; a, McKim, Mead & White.... 54th st, n s, 280.4 w 8th av, two br st ten; cost each $20,000; o, Wm. McBirney; a, W. J. Merritt....54th st, n s, 150 w 8th av, two br st ten; cost ea $20,000; o, Samuel McMillan; a, W. J. Merritt... 63d st, s s, 81.5 e 1st av, four br ten; cost each, $20,000; o, Caroline Yost; a, R. Rosenstock....2d av, n e cor 69th st, one br st store and dwel; cost $17,000; o, Jacob L. Maschke; a, Jno. C. Burne....2d av, e s, 27 n 69th st, six br st stores and ten; cost $102,000; o and a same as last ....2d av, s e cor 70th st, one br st store and ten; cost $17,000; o and a, same as last....69th st, n s, 80 w 2d av, seven br st ten; cost $118,000; o and a, same as last....69th st, n s, 100 e 2d av, four br st ten; cost $68,000; o and a, same as last....70th st, s s, 374 e 3d av, eight br st ten; cost $135,000; o and a, same as last....70 st, s s, 349 w 1st av, eight br st ten; cost $128,000; o and a, same as last....80th st, n s, 100 e 3d av, two br st ten; cost $85,000; o and a, same as last ... 81st st. s s, 150 e 3d av, two br st ten; cost each $34,000; o and a, same as last....82d st, s s, 156.6 e 1st av, one br st ten; cost $16,000; o and a, same as last....109th st, s s, 100 w 2d av, six br st ten; cost $90,000; o and a, same as last....327 E. 109th st, one br ten; cost $8,500; o, Chas. V. B. and M. Homan; a, W. Fernschild & Son....2d av, n e cor 93d st, seven br ten; cost each $15 000; o, Jacob ick, Jr.; a, J. Brandt....St. Nicholas av, n e cor 145th st, twelve fr dwel; cost each $5,000; o, S. M. Milliken, Madison av, cor 77th st; a, T. M. Clark ....St. Nicholas av, e s, 130 n 145th st, five fr dwel; cost each $5,000; o, Wm. Thompson; a, T. M. Clark....145th st, n s, 41 e New av, which new av is 200 e St. Nicholas av, four fr stores and ten; cost each, $3,000; o, R. P. Messiter; a, T. M. Clark ..New av, e s, 916.11 n 145th st, fr dwel; cost each $1,100; o, Mary Klots; a, M. Pfoertner... 144th st, n s, 200 e Willis av, two fr ten; cost each $10,000; o and a, Benjamin Richardson....Courtlandt av, n w cor 156th st, one br ten; cost $10,000; o, Margaret Wagner; a, W. Kusche.

ALTERATIONS, NEW YORK CITY.

315-317 w 35th st, part of rear wall rebuilt, windows opened; cost $3,000; o, Rosalige Steinhardt: a, C. F. Ridder, Jr....240 E 45th st, br exten, front and interior alterations; cost $5,500; o, Communante Israelite Francaise; a, Chs. Sturtzkober....58 Cedar st, interior altered for offices, rear exten wall rebuilt; cost about $7,000; o, Mrs. Angelina E. Skidmore; a, E. A. Sargent....108 Wall st, two patent fire-proof flues in west wall, front alterations; cost $4,000; o, Cath. M. Jones, guardian of Helen A. Jones; a, J. Mumford....604-606 11th av, add one-half story, alterations to store and ten; cost $3,200; o, Peter Murphy and Hugh M. Pollock; a, C. F. Ridder, Jr....217 E 23d st, extdg to 24th st, thorough repair, carriage house and stable, to have iron lintel over opening, between lane; cost $3,000; o, Isaac Stern; a, H. Fernbach.

BROOKLYN.

North Elliott pl, w s, 430 n Auburn pl, one br school house; cost $20,000; o, Board of Education; a, J. W. Naughton....4th pl, n s, 150 e Henry st, three br st dwel; cost each $ 4,000; a, Alfred Williams ....Madison st, n s, 350 e Nostrand av, four br st dwel; cost each $3,500; o and a, T. W. Swimm .. Quincy st, n s, 200 w Tompkins av, four br st dwel; cost each $4,500; o, Paul C. Grening....694 Flushing av, s s, 125 w Throop av, one fr ten; cost $4,500; o, Peter Stebe; a, Th. Englehardt... Lafayette pl, n s, 150 e Broadway, three fr dwel; cost each $3,000; o, S. W. Post; a, Mr. Smith .. South 4th st, n s, 75 w 10th st, two br ten; cost each $10,000; o, Alexander Wade....Pulaski st, n s, 175 to 235 w Stuyvesant av, three fr dwel; cost each $2,200; o, R. F. Clayton....Diamond st, w s, abt 150 s Norman av, two fr ten; cost each $3,500; o, Owen Galagher; a, F. Weber ....46 Broome st, s s, 50 w Humboldt st, one fr dwel; cost $5,500; o, Herman Hell, New York City; a, F. Weber....8th st, s s, 247.10 w 7th av, four br dwel; cost each $4,500; o, E. M. Baker and S. H. Bortsly; a, Thomas Corrigan....Grand st, n s, 25 e 7th st, one br store and dwel; cost $6,500; o, James Winham; a, E. F. Gaylor.... St. Marks av, n e cor Carlton av, three br st dwel; cost each $9,000; o, John Monas; a, J. J. Gilligan....5th st, n s, 299 w 7th av, twelve br dwel; cost each $3,500; o, Charles Long....Luqueer st, n s, 165 w Court st, two br ten; cost each $3,500; o, Thomas Keogh.

BROOKLYN ALTERATIONS.

482 Franklin av, w s, br exten; interior alterations; cost $4,500; o, David M. Stone; a, Amzi Hill....Sands st. n w cor Adams st, raised one story, etc, cost $6,000; o, Hugh Larken; a, J. F. Thomas.

BOSTON, MASS.—179, 181, 183, 185, 187 Marion st, 5 fr dwel; o. Geo. W. Hayward; b, L. A. Pierce & Geo. W. Hayward.. Lamartine n Roys st, 5 fr dwel; o, Gustar N. Bartusch; b, Robt. D. Ward..34 Magazine st, fr dwell; o, James Galvin; b, F. J. Pootunate ...Pratt st, nr Linden st, fr dwel; o, Ambrose W. Abbott; b, Wm. B. Cameron....228 & 230 Meridian st, & 3 Central sqr, br office & store; o, J. Henry Stevens; b, J. Henry Stevens ..234 & 236 Meridian st, br office & store; o, J. Henry Stevens; b. J. Henry Stevens..236 & 238 Meridian st, br office & store; o, J. H. Stevens.. Dorr opp. Earl st, dwel & st; o, S. A. Wood Machine Co.; b, Holbrook & Harlon....Pearl st, opp Atlantic ave, br Merchantile bldg; o, Chas. Faulkner; b, Thos. J. Whidden & Co .. 224 & 228 Clarendon st, family hotel; o, N. M. Jewett; b. Steven Moxon.

BUFFALO, N. Y.—Carroll cor Well st, fact'y, cost $65,000; o, Root & Keating; a, C. K. Porter; b, C. Berrick ...Washington st, cor n Division st, printing house; cost $100,000. o, Jas. D. Warren; a, R. A. Waite; b, C. Berrick....Eagle st, nr Ellicott st, st & dwel; cost $7,000; o, Mrs. D. Keefe; a, Geo. J. Metzger.

CHICAGO, ILL.—Garfield Park picturesque casino in frame, cost $17,000 o, the city; a, Burnnam & Root; b, not let ...S. W. cor Cass & Ontario st, br dwel; cost $50,000; o, Judge Lambert; a, Peabody & Stearns; b, Clark & Fuller ...S. W. cor Cass & Ontario st, dwel & barn; cost $6,000; o, Judge Tree; a, Peabody & Stearns; b, Clark & Fuller ...W. Monroe & Leavitt st, 4 br dwel; cost $20,00.; o, D. S. C. Conque; a, Dixon & Townsend; b, not let....Monroe west of Leavitt st, br flat; cost $6,000; o, Mr. Moulton; a, Dixon & Townsend; b, not let ..Prairie ave n of 29 st, br st & dwel; cost $14,500; o, E. P. Palmer; a, same; b, not let ...Central Park, 2 cottages; cost $5,000; o, H. Brummel; a, Furst & Rudolph.... Cor South Park ave and 35th st, 6 bldg; cost $38,000; o, Dr. H. Merkle; a, Furst & Bradley; b, H. Apple....295 Huron st, br dwel; cost $17,000; o, Gordon Moore; a, Cobb & Frost; b, Clark & Fuller .. Laflin & Von Buren ave, 5 br st & dwel; cost $15,000; o, H. S. McLean; a, J. J. Flaveler; b, Thom. Nicholson... 2409 Prairie ave, br dwel; cost $5,000; o, O. S. Sumner; a, none; b, owner....2509 Archer ave, br st & dwel; cost $5,600; o, K. Mueller; a, P. W. Ruehl; b, Swartz....Dearborn av nr Washington Park, stone club house (repairs; bldg burned March 27); cost $40,000; o, Union Club; a, Cobb & Frost; b, Clark & Fuller.... Thirty-third & Dearborn st, armour br memorial bldg; cost $80,000; o, Charity Trustees, a, Burnham & Root; b, not let.. . S. w. cor Congress and Wabash ave, br st & ten cost $100,000; o, J. Q. Adams; a, Treat & Foltz; b, A. A. Price....Michigan ave & 24th st, stone addition to church; cost $21,000; o, Christ Parish; a, not decided; b, not decided....526 W. Van Buren ave, st & br dwell; cost $10,000 o, Joseph Raster; a, Rehwalt b, Chas. Thiele....101 & 103 Clark st, br addition to store; cost $15,000: o, W. H. Dillingham....369 S. Morgan br flat; cost $5.000; o, Wm. Fricke; a, none; b, owner . 408 S. Wood ave, br flats; cost $7,000; o, G. L. Max; a, L. G. Holburg; b, O'Connell....538 W. Van Buren ave, br dwel; cost $7,500; o, C. H. Martens; a, Louis Martens; b, H. Hebard....410 Canal ave, br warehouse; cost $26,000; o, L. A. Slade; a, W. Strippel; b, H. Apple.... 3214-3218 Forest ave, 3 br dwel; cost $6,000; o, C. R. Hickok; a, none b. owner... 550 N. Pavliva st, br st & dwel; cost $5,600; o, Jno Gals; a, M. Swetzer; b, W. Meyrn.... 745, 747 W. Indiana br st & flat; cost $7,500; o, B. H. Hayes; a, Wm. Striphelman; b. B. H. Hayes....Low ave nr 30th st, 6 br cottege; cost $6,500; o, F. H. Foile: a. none; b, owner... 234 Lincoln st, br dwel; cost $5,500; o, Streeter & Tucker; a, none b, owner....1019 W. Twelfth st, br dwel; cost $5,000; o, Louis Roeder; a, none; b, owner....3144, 3146 Wabash ave, 2 br dwel; cost $16,000; o, Alex McIntosh; b, O'Connell & McGinness....105 Indiana st, br st & dwell; cost $8,000; o, A. G. Lund; a, C. O. Hansen; b, Lund & Gilbert .. Selden bet Wood & Lincoln st, 9 br dwel; cost $22,000; o, Noyes & Galfin; a, none; b Galfin .. 653 655 Harrison ave, 3 br dwel; cost $12,000; o, O'Connell & McGinness; a, G. Halburg; b, owners... 349 Division ave, br st & dwel; cost $5,500; A. Laufermann; a, none; b, owner.

CINCINNATI, OHIO.—176 and 178 4th st, alter br; cost $500; o, E. W. Cunningham; b, C. W. Howland ...Jane, nr Baymiller, br; cost $7,500; o, H. H. Fricke, b, Harwood & Son....Main, nr Liberty; add. br, cost $8,000; o, Schalter Bros; b, Henry Weist....Hammond nr Euclid, br Woodburn, nr Lincoln, two br, cost $9,000; o, H. Klinckheimer; b, Kemme and Rosenstiel.

CLINTON, IOWA.—7th av, nr 4th st, remodel, cost $12,000; o, W. J. Young; a, and b, John Anderson.

DETROIT, MICH —365 Cass av, br dw, cost $5,000; o, Gasper Hollhoefer.. Campan av, add'n to factory, cost $5,000; o, Wolverine Car Co....4th av, three fr dwels, cost $9,000; o, A. Beaton ....Cass av, br school house, cost $30,000; b, Nappenan and Clark....181 and 183 Charlotte av, two br dwels, cost $6,000; b, G. W. Buffans....46 Canfield av, br dwel, cost $8,000; o, Julius Hess Second st. br dwel, cost $5,000; o, A. C. Varney.... Grand River av, add'n to br brewery; cost $10,000; o, Julius Hess.

PHILADELPHIA, PA.—N e cor. 24th and Christian sts, store and dwell, o, Chas. Lafferty .. Thompson, e from 24th st, 20 dwells; o, J. H. Lyons... Berks and Croskey sts, 5 dwells; o, James Caven ....5526 and 28 Vine st, 2 dwells; b, W. D. Kunkle.. Spring Garden, e of 32d st, 13 dwells, o, Elkins & Peters... Nicholas, 24th to 25th st, 56 dwells, o, Jas. E. Dingee...618 York st, dwells; b, W. Bartholomew....Leiper and Orthordox st, 2 dwells; b, Wendell & Smith..Leiper and Allen st, dwell, b, Wendell & Smith ....1709 Sydenham; dwell, o, Jacob E. Ridgway....Cumberland, w 15th st, 8 dwells, b, W. H. Lower.. Garfield av, bet. Garner and Wakefield; store and dwells; b, C Ancopp... Shelton av, w Magnolia, factory; o, T. W. Wright & Sons....22d, s Sansom st, dwell; b. Chas. D. Supple....Cumberland, w 7th, 9 dwells; o, H. M. Housekeeper... Leiper, n Unity, 2 dwells; b, D. B. H, Foulkrod . Lackawana, e Penn, 4 dwells; b, D. B. H. Foulkrod ....Turner, w 22d st, dwell; o, Henry H. Brown....Plumb, e Jefferson, 2 dwells; b, A. H. Taylor....1309 W. 2d st, store: o, P. Collins & Sons...Oxford, w 25th st, 22 dwells; o, John Carre ....Vienna, n Frankford Road, 2 dwells; b, W. R. Brown .. 939 8th st, dwell; b, Jas. Hood....Allen, bet. Marlborough and Shackamanon, 2 dwells: o, George T. Payne & Co....Marshall and Norris. dwell; b, W. H. Lower .. Snyder av and 9th st, 3 dwells, b, E. Cubberby....Cresson, ab Adams, 2 dwells; b, D. B. Manley....Pachin, e Shurs lane, 6 dwells; b, D. R. Manley.... Maine, e Shurs Lane, dwell; b, D. R. Manley....Montgomery av and Mervine, factory; b, Jas. T. Bradfield... S w cor. 32d st and Westwood, 2 dwells; b, Wendell & Smith 27th, w Dauphin, dwell and stable; b, John Berner....2514 N Fifth, dwell; b, Geo, Manden.... Fifth, n Diamond, dwell; b. Geo. Manden.... Green Lane, nr York, 2 dwells; o, W. m. and G. W. Farrell.... 2521, 22, 23, 24 Hancock, 4 dwells; b, D. Nevlin....Woodvale av, w Ridge av; 3 dwells; b, A. A. Harmer... 1130, 32, Frankford Road, 2 dwells, b, G. H. Stevenson....Frankford Road & Hart Lane, dwell, b, Jno. D. Dawson....Huntingdon, w Lawrence; 6 dwells; o, Fred. K. Lambrect....Orkney, s Lrwrence, 5 dwells; o, Fred. K. Lambrecht....Haines. nr Morton, 5 dwells; o, Geo. Hearst... Christian, nr 8th. dwell, o, Raphael Angarola.... Hancock, nr Arnat, 2 dwells; o, D. S. McKnabb.. Market st, s w cor 7th st, bank building; b, Thos. Little....Charlton av, n Main, 2 dwells; b, Tourison Bros... Chilton av, e Hancock, dwell; b, Tourison Bros... Park, n Oxford, 7 dwells; o, John L. Carre... Repka, nr Mansion. 3 dwells; o. John Bannon.... 9th, s Wharton, 4 dwells....b, John McConaghy ..N w cor 6th st and Norris av, 7 dwells, o, A. M. Zane....554 N. Second, addition to store; b, Thos. McCartney....Master, bet. 24th and 25th st, 20 dwells, o, John M. Sharp....Sharswood, bet. 24th and 25th st, 43 dwells; John M. Sharp... Wrights, bet. 24th and 25th st, 19 dwells· o, John M. Sharp....24th, ab. Wright, 6 dwells; o, John M. Sharp....N e cor 15th and Mt. Vernon, 13 dwells, o, John M. Sharp....Fitzwater, w of 18th, dwell; o. W Sweeny.... Tacony, s Bridge, dwell; b, John S Taylor....State Road and Dewalaure av, 4 dwells; o, E. Palmer... 52d st, s Jefferson, 3 dwells; o, D. C. Cleaves....Islington, nr Berhn, 17 dwells. o, John Carson....7th st, s of Morris, 2 dwells; b, J. C, Stackhouse.

WASHINGTON, D. C.—Conn. ave and R st, br dwel and basement; cost, $14,000; o, Charles Edmonston....Corcoran st, bet 14th and 15th, br dwel and cellar; cost, $5,000; o, C. Rupert; a, C. Diddon. ....cor 1st and F sts, n w, three br dwel and basements; cost, $10,000; o, Mrs. J. Widmayer; a, C. Schneider; b, Chas. Held.

SIOUX CITY, IOWA.—Corner Third and Jennings sts, veneered hotel; cost, $6,000; o, Henry Milkee; b, E. C. Wakefield....Second st, west side, cottage.

SPRINGFIELD, MASS.—N. Main st, br dwel; cost, $9,000; o, R. H, Smith; a, Richmond & Seabury; b, E. W. Shattuck... State st, church; $30,000; o, Hope Congdon; a, Richmond & Seabury; b, L. O. Eaton....Maple st, staple; $5,000; o, W. Wessan; a, Richmond & Seabury.

AMHERST, MASS.—Frame dwel; cost, $5,000; o, Prof. Morse; a, E. C. Gardner; b, Shattuck....fr dwell; cost, $5,000; o, Dr. Henshaw; a, E. C. Gardner.

ST. LOUIS.—Laclede ave, bet 31st and 32d sts, br dwel; cost, $10,000; o, C. P. Wise; a, J. B. Legg; b, A. E. Cook... 20th st, bet Cass ave and Mullanphy st, br dwel; cost, $5,000; o, H. Kaiser; a, C. May; b, Bothe & Rattermann....Austin, bet 13th and 14th sts, br chemical works; cost, $6,500; o, W. H. Chappell & Co; a, Renick; b, R. P. McClure....Finney, bet Grand and Vandeventer ave, br dwel; cost, $5,000; o, J. S. Griffin, a, T. Furlong; b, B. Brady. ...2nd st, bet Webster and Labeaume sts, machine shop; cost, $6,500; o. American Brake Co; a, Cairns; b, Bright Bros... Arsenal st, bet Columbus and I M. R. R. tracks, iron clad building; cost, $5,000 Lafayette, bet 2nd Carondelet and Mississippi aves, dwel; cost, $8,500; o, G. A. Finkelnburg; a, E. Mortimer; b, Beckemere & Rickman....Lasalle st, bet 2nd Carondelet. and Mississippi aves, dwel; cost. $5,500; o, St. L. Mart House Bld'g Co. No. 3; a. Mortimer; b. Beckemeier & Rickman....Chestnut st, bet Beamont and Leffingwell aves, br dwel; cost. $5,700; o, Geo. R. Lockwood; a, Isaac M. Kirkwood....Delmar, bet Grand and Vandeventer aves, dwel; cost, $12,000; o, Geo. S. Foster; a, Kuchner; b, Weber & Co....Finney, bet Grand and Vandeventer aves, br dwel; cost, $5,000; o, B. Quigley; b, A. J. Cramer.

WORCESTER, MASS.—Winslow st, br school house; cost $14,000; o, City of Worc; a, E. Boyden & Son; b, Jere. Murphy... High st, br parsonage, cost $12,000; o, Rev. J. J. Power; a, E. Boyden & Son; b, J. R Fish. Summer st, br ten house; cost $5,800; o, A. G. Weatherbee; a, none; b, J. A. Brigham... Odange st, br ten house; cost $6,000; o, Mrs. Baldwin; a, Fuller & Delano; b, Willard Ward.

(The rest of our building intelligence has been crowded out this week.)

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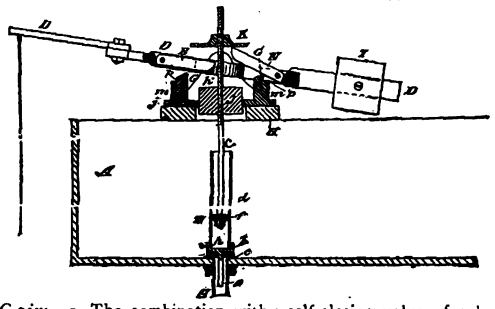
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

266,963. OPERATING TANK-VALVES. JAMES E. BOYLE, Brooklyn, assignor to Henry Huber, New York, N. Y. Filed May, 12, 1882. (No model.) Issued November 7, 1882.



Claim.—1. The combination with a self-closing valve, of a lever and suitable intervening mechanism, substantially as described, whereby at each vibration of said lever said valve will be opened, in the manner substantially as set forth.

2. The combination, as a means for operating a self-closing tank-valve to produce a double discharge from the tank, of the weighted tank-lever, a pivoted dog or small lever in connection therewith, a spur arranged under said dog at a point intermediate of its free and pivoted ends, whereby upon the tilting of the tank-lever the free end of said dog shall be elevated, and an overhanging portion, in connection with the valve, arranged over and to be lifted by the free end of the said dog, substantially as set forth.

3. The combination of lever D, pivoted dog E, spur G, valve-stem C, and overhanging portion connected to said stem, and arranged over and to be lifted by the free end of said dog, substantially as set forth.

4. The combination of lever D, dogs E E, pivoted thereto, bearing-frame F for said lever, and fixed spurs G G, substantially as set forth.

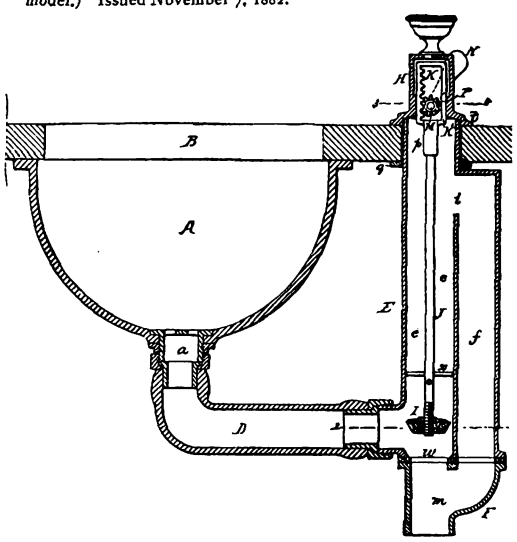
5. The combination of lever D, dogs E E, bearing-frame F, spurs G G, valve-stem C, and disk K, adjustible on said stem, substantially as set forth.

6. The combination of valve-stem C, weight J, and disk K, with lever D, dogs E E, bearing-frame F, having hole *l*, and spurs G G, substantially as set forth.

7. The combination of lever D, having trunnions *i i*, and dogs E E, with frame F, formed in two parts, each consisting of a section of base-plate, *j*, a wall, *k*, pierced with a hole to receive one of said trunnions, and a post, *m*, on which is formed a spur G, substantially as set forth.

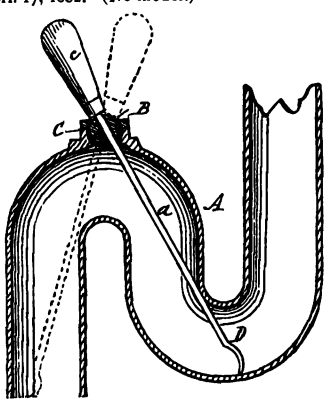
8. The combination of lever D, dogs E E, pivoted thereto at equal distances from the fulcrum of the lever, and two fixed spurs, G G, arranged one under each dog, and the two unequally distant from said fulcrum, substantially as set forth.

267,156. OVERFLOW VALVE FOR WASH-BASINS. WILLIAM S. COOPER, Philadelphia, Pa. Filed Sept. 17, 1881. (No model.) Issued November 7, 1882.



Claim.—The combination of the overflow-chest, the valve I, and valve-spindle J, with rack K, the cap H, the pinion P, the spindle M, and handle N, adapted to hold the valve-rod in either of its extreme positions, as set forth.

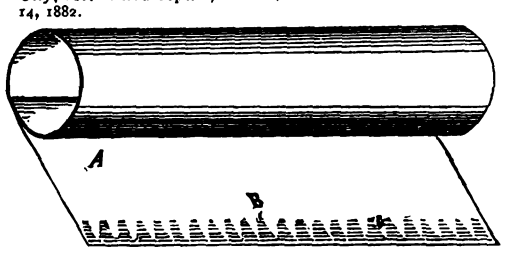
267,806. WATER-TRAP CLEANER. JOHN S. GALL, Rochester, N. Y., assignor of one-half to John W. Orphy, same place. Filed April 17, 1882. (No model.) Issued November 7, 1882.



Claim.—1. The combination, with an S-trap, of a shaft, forming a fork or paddle, passing through a rolling or self-adjusting bearing at top bend of the trap, said shaft having end movement in the bearing and being capable of being inserted in the lower bend of the trap, of being elevated therefrom, and of being thrown over into the discharge end of the trap, as set forth.

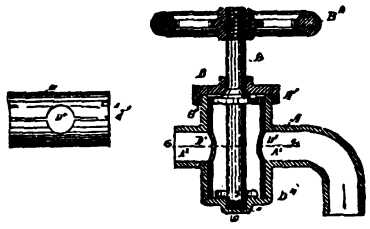
2. The combination, with an S-trap, of the ball *B* and socket C in the top bend of the trap, and the fork or paddle D, provided with a a shaft, *a*, which passes through a hole in the ball, the ball being capable of rotary movement in its socket and the shaft capable of end movement in the ball, as herein shown and described.

267,826. DRAIN TILE OR PIPE. NEWTON B. CHILDS, Kansas City, Mo. Filed Sept. 8, 1882. (No model.) Issued November 14, 1882.



Claim.—In the manufacture of cement or asphaltum pipe, the sheet of metal having a portion along its edge provided with slots or perforations, whereby such perforated portion, as compared with the rest, is gradually rendered non-elastic, for the purpose specified.

268,006. STOP-COCK. JOHN L. DIBBLE, Brooklyn, N. Y. Filed Feb. 16, 1882. (No model.) Issued Nov. 28, 1882.



Claim.—1. In a stop-cock, the elastic plug-shell D, formed of a single piece of metal, in combination with a turning shaft, B, and connections thereto, which allow the shell to be expanded by the pressure of the fluid, and with the casing A, having the water-way A^2 A^3, as herein specified.

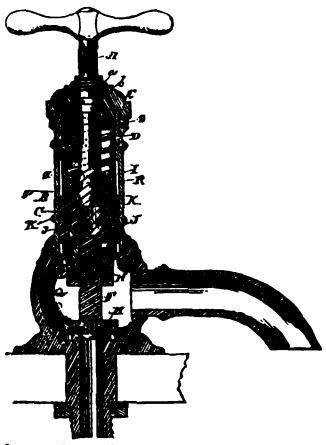
2. In a stop-cock, the elastic plug-shell D, in combination with a *soft exterior facing*, E, and with the shaft B, arms B^3 B^4, and inclosing-case, A, as herein specified.

3. In a stop-cock, the compound elastic shell D, composed of two thicknesses of sheet metal, D^1 D^2, arranged as shown, so that the joint of one shall come opposite a continuous portion of the other, as herein specified.

4. The casing A, shaft B, elastic shell D, arms B^3 B^4, thereto, conical surface B^1, and spring C, arranged to serve relatively to each other and to the casing A of a stop-cock, as herein specified.

5 The elastic shell D, compounded of two layers of tapering thickness, arranged as shown, and provided with the engaging projection d^1 and the aperture d^2, in combination with the operating-shaft B, with its arms B^3 B^4, conical surface B^1, spring C, and inclosing-case A, arranged for joint operation, as herein specified.

267,733. SELF CLOSING FAUCET. CHAS. WHITTAKER, Chicago, Ill. Filed May 12, 1882. (No model.) Issued Nov. 21, 1882.



Claim.—1. In a self-closing faucet, a chamber located above the spout, provided at its lower end with a partition adapted to exclude the water from said chamber, in combination with a screw sleeve, a valve rod, and a spiral spring, located in said chamber above said partition, said sleeve being provided with a rod extending through said partition to the lower side or entrance to said water chamber, substantially as set forth.

2. In a self-closing faucet, a chamber for the reception of the spring valve rod and sleeve, provided at its lower end with a partition located below said spring and sleeve for excluding the water, whereby the packing at the upper end of the valve rod is dispensed with and the spring and sleeve are protected from the water, as set forth.

3. The chamber I, having cap E, formed in the same piece therewith, provided with groove K, in combination with rod A, provided at its lower end with screw B, spring D, sleeve C and rod F, valve M, packing or partitions H, and chamber G, substantially as set forth.

4. The device for retaining the valve rod in place and counteracting the force of the spring when raising the valve, by which the retaining nut is prevented from turning, consisting of annulus *b*, having a square central opening fitted to and adapted to turn with the valve rod, conforming in shape thereto, nut *a*, secured to said rod and adapted to rest on said annulus, said annulus being adapted to turn with said rod and nut, whereby the nut is relieved from liability of being unscrewed, as set forth.

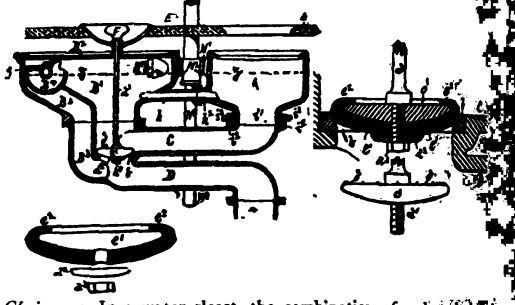
5. In a self-closing faucet, the combination of the valve rod A, provided with screw B, sleeve C, adapted to move upward and downward in said screw, and spring D, said screw being adapted, when turned, to raise said sleeve and compress said spring, whereby the valve is opened, said spring being adapted to press down said sleeve and reverse said screw automatically, whereby said valve is closed, as set forth.

6. In a faucet having a chamber located above the spout and a partition interposed between said chamber and said spout, a sleeve located above said partition, and a rod projecting below said partition, in combination with a detachable valve, whereby said rod may by removing said valve be inserted through said partition, as set forth.

7. The screw sleeve C, provided with circular flange P, for supporting the spring, collar R of less diameter than said flange, in combination with spring D and valve rod A, said collar being adapted to retain said spring at the periphery of said flange and prevent contact of said spring and screw rod, as set forth.

8. The combination of cap E, provided with recess S, with spring D, rod A, and sleeve C, as set forth.

268,028. WATER-CLOSET. FRANCIS W. KELLY, Minneapolis, Minn. Filed July 20, 1882. (No model.) Issued Nov. 28, 1882.



Claim.—1. In a water-closet, the combination of a deposit-bowl and a water-tank, both adapted to hold water and communicating with each other below the water-line of both, and a valve which, when opened, permits the contents of the bowl to be discharged and the water to pass from the tank through the bowl in quantity sufficient to flush the bowl, substantially as and for the purpose set forth.

2. In a water-closet, the combination of a deposit-bowl and water-tank communicating between their upper and lower ends and having a tubular connection at their lower ends, in combination with a valve serving to cut off the tank from the tube communicating with the bowl, and also as a valve for controlling the discharge of the deposits from the bowl and the influx of water from the tank to the bowl, substantially as and for the purpose set forth.

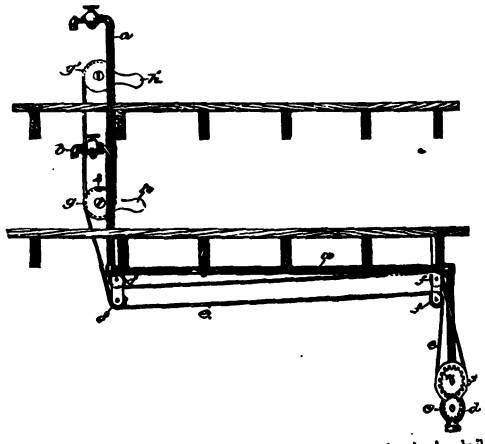
3. The combination of tank B^1, provided with an overflow, B^3, and having a contracted neck, bowl A, connecting with the tank by a flushing-tube, h^1 h^2, tube C, and a valve e^1, controlling the opening and closing of tube C, and fitting in the neck of the tank, so as to cut off the tank from tube C and cause the water to flow from the tank into the bowl through the flushing-tube, substantially as and for the purposes set forth.

4. The combination of the bowl A, tank B^1, connecting-tube N^1 N^3, and ventilating-tube N^4, substantally as set forth.

5. The combination of bowl A, tank B^1, tubes G^2 G^3, ports s^1 s^2, a valve for controlling the flow of water from one of said tubes to the other, and a float connected to and adapted to be moved to open and close said valve, substantially as set forth.

6. The tube D, having the valve-seat *b*, in combination with the valve consisting of the disk c^1, rubber cushion c^1, adapted to fold over the edge of said disk, and stem d^1, substantially as set forth.

268,062. APPARATUS FOR TURNING OFF WATER IN BUILDINGS. JOSEPH D. WESTGATE, Manchester, N. H., assignor of one-half to Geo H. Allen, Lynn, Mass. Filed June 12, 1882. (No model.) Issued Nov. 28, 1882.



Claim.—1. The combination with the water-supply pipe in a building, of a stop-cock located near the point where the said pipe enters the building, and means to actuate the said stop-cock from various different points in the building, substantially as described.

2. The stop-cock provided with an actuating pulley, combined with a flexible cord or belt connected with an actuating pulley having a handle, and located at a distance therefrom, substantially as described.

268,024. WOODEN PIPE. LUMAN F. JOHNSON and IRA E WILLIAMS, Palmyra, N. Y. Filed Aug. 14, 1882. (No model.) Issued Nov. 28, 1882.

268,031. INCREASING AND REDUCING JOINT FOR ELECTRIC-WIRE CONDUITS. CHARLES LINFORD, Pittsburg, Pa. Filed Feb, 15, 1882. (No model.) Issued Nov. 28, 1882.

268,035. FURNACE. JOHN G. MCAULEY, New York, N. Y. Filed Oct 22, 1881. (No model.) Issued Nov. 28, 1882.

268,059. SUBMARINE ELECTRIC CABLE. RICHARD S. WARING, Pittsburg, Pa. Filed Apr. 10, 1882. (No model.) Issued Nov. 28, 1882.

268,060. ELECTRIC CABLE. RICHARD S. WARING, Pittsburg, Pa. Filed Sept. 27, 1881. (No model.) Issued Nov. 28, 1882.

268,077. DEVICE FOR BURNING PETROLEUM. RICHARD A. BURY and ROBERT M. BIDELMAN, Adrian, Mich. Filed Sept. 16, 1882. (No model.) Issued Nov. 28, 1882.

268,081. STEAM-TRAP. GEORGE W. COFFEE, San Francisco, Cal. Filed Aug. 12, 1881. (No model.) Issued Nov. 28, 1882.

268,082. SAFETY-VALVE. GEORGE E. COLLIER, Bay City, Mich. Filed June 10, 1882. (No model.) Issued Nov. 28, 1882.

268,083. GAS STOVE AND BURNER AND HEATING-DRUM. EMANUEL DETWILER, Milwaukee, Wis. Filed Sept. 28, 1882. (No model.) Issued Nov. 28, 1882.

268,096. GAS-RETORT FURNACE. HENRY C. HANN, Baltimore, Md. Filed Sept. 8, 1882. (No model.) Issued Nov. 28, 1882.

268,098. STEAM-BOILER FURNACE. WILLARD T. HATCH, Indianapolis, Ind., assignor to the Atlas Engine Works, same place. Filed Oct. 5, 1881. (No model.) Issued Nov. 28, 1882.

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Food and Drugs.

COFFEE AND MUSTARD MIXTURES.

STATE BOARD OF HEALTH OF NEW YORK,
ALBANY, *March* 28, 1883.

To the Editor of THE SANITARY ENGINEER:

As the Governor has approved the action of this Board, as expressed in its resolution here annexed, I forward to you a copy for publication, as requested. Certainly, no coffee merchant will feel harmed, excepting he be of the class which this action compels to supply wholesome coffee instead of some spurious mixture.

The requirements of at least 40 per cent. of farina of mustard as the minimum of the article must "rule out" the chaff and dust that might pass in market as the mustard of trade but for this specification.

Respectfully yours, ELISHA HARRIS.
Secretary.

"*Resolved,* That under and pursuant to Section 4 of Chapter 407 of the laws of 1881, the following mixtures when distinctly labelled in the manner provided in subdivision 7 of Section 3 of said Act, are within the conditions hereinafter prescribed declared to be exempt and permitted to be sold under the provisions of the said Act.

"1st. Coffee mixtures containing no other substances except chicory, peas or cereals, and in which mixtures the pure coffee shall not be less than 50 per cent. of the whole mixture or compound, provided that the exact percentage of coffee be printed upon the label of each package.

"2d. Mustard mixtures with wheat or rice flour, to which no other substance, or article, or any coloring matter, except tumeric is added, and in which mixture the pure farina of mustard shall not be less than 40 per cent. of the whole mixture or compound, exclusive of the mustard hulls.

"The labels on the above mixtures shall contain the names of each and every ingredient of the mixture.

"The labels shall also exhibit the percentage of the characteristic constituents; for example, the percentage of coffee in the coffee mixture and the percentage of mustard in the mustard mixture.

"The above mentioned information shall be printed on the labels in black ink, in legible antique type, of a size easily to be read, on one side of the package."

Approved March 24, 1883.
(Signed.) GROVER CLEVELAND.

True Copy from the Minutes of the Board, meeting Feb. 24, 1883.
(Signed) ELISHA HARRIS, Sec'y.

BOARD OF HEALTH REPORTS.

FIRST REPORT OF THE BOARD OF HEALTH OF THE CITY OF MACON, GA. By J. EMMETT BLACKSHEAR, M.D., Chairman, for the year 1882. 15 pp., 8vo.

The greater part of this report consists of a sort of lecture to the Mayor and Council on the importance of sanitation. It is a very good lecture, but it does not convey that amount and kind of information which we like to find in such a document.

From the tables at the end we learn that there were 240 deaths in the city during the year, 77 of which were under five years of age. There were 35 deaths from consumption, 17 deaths from malarial fevers, and five from typhoid. In connection with these figures should have been given some information as to the sewerage and drainage of the city. We are told that "the sewer recently constructed from Cherry street to the river does credit to the city," and that it cost $15,000. Now we should like to know how this sewer was constructed; its size, number of connections, etc. If it is a model sewer, it should be described so that other cities can do likewise.

The Board has a sanitary inspector, but he does not seem to have found anything in particular; in fact, the only thing we learn about him is that his salary is $600.

We have no doubt that the Board of Health of Macon is a useful institution and doing good work, but its attention should be called to the fact that a hygienic tract filled with quotations is not a report, and that if it wishes to gain the respect and confidence of the citizens of Macon, and of sanitarians elsewhere, it must get out of the sphere of glittering generalities and furnish some information. Every one of those typhoid fever deaths was a problem to be investigated by the Board. How was it caused? What were the causes of death among the children? What sort of milk supply has the city? And we could easily put a hundred such questions, a complete answer to any one of which would be worth a ton of essays on the importance of sanitation in general.

We hope that the next report will tell us something about Macon—its drainage, sewerage, water supply, markets, prevailing diseases, etc.—for at present we do not know where to advise a traveller to look for this information.

THIRD ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF SOUTH CAROLINA, for the fiscal year ending October 31, 1882. 211 pp., 8vo.

The State Board of Health of South Carolina is the Medical Society of that State, which exercises its functions in this respect through an Executive Committee of seven members, appointed by the Governor on the recommendation of the Association, together with the Attorney General and Comptroller General of the State, who are members *ex officio*.

The Secretary of this committee, Dr. H. D. Fraser, of Charleston, reports that there have been no extensive epidemics during the year, and that as regards local epidemics, only 17 of the 46 local Boards of Health have sent replies to a circular issued calling on them for information.

The Chairman of the Committee on Endemic and Epidemic diseases, Dr. J. Ford Prioleau, of Charleston, calls attention to a disease prevailing in the State, which appears to be a form of contagious ophthalmia resulting in granular lids, very much like that which was so prevalent in Belgium some years ago. He remarks that malaria is increasing in the State, and that the colored population are losing the immunity which they formerly enjoyed against this disease. Consumption is also becoming more prevalent and fatal in the colored race.

The Committee on Quarantine, Dr. T. Grange Simons, Chairman, reports strongly in favor of keeping up the Sapelo Sound Refuge Station, to which can be sent such vessels as it is not considered safe to admit to the harbors of the State. The appendix contains brief popular essays on the hygiene of schools, by Dr. B. W. Taylor, on the injurious effects of the improper use of the sewing machine upon women, by Dr. W. T. C. Balis; on soil pollution, by Dr. Mayer; on teething children, by Dr. A. S. Hydrick; the organization of local boards of health, by Dr. Simons; on healthy cottages, by Dr. Hanahan; the relation of slaughter houses to the public health, by Dr. John B. Elliott, of New Orleans; on excessive use of tobacco, by Dr. Evans, and on the duties of the State to the inebriate, by C. R. Tabor.

It is possible that essays of this kind are read by some people, and that they do some good. Certainly the majority of sanitarians in this country seem to think it advisable that such essays should be prepared and printed in connection with reports of State boards of health, but we most confess to having great doubts as to their utility.

South Carolina appears to have no system of registration of vital statistics, and the Board makes no recommendation with regard to the establishment of such a system. We do not find any financial statement in the report, and infer that there were no appropriations. On the whole, the State Board of Health of South Carolina seems at present to have no powers and no funds, although in the case of the occurrence of imminent danger, in the form of an epidemic, it would no doubt be found useful. We sincerely hope that its efforts at educating the people and the legislators as to the importance of sanitary work may meet with success.

BOOKS RECEIVED.

TRANSACTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS. Vol. XII. Proceedings, Vol. IX.

REPORT ON THE WORKS OF SEWERAGE AND DRAINAGE PROPOSED FOR THE TOWN OF CANNES, FRANCE. By Douglas Galton, C.B., D.C.L., F.R.S.

POCKET LOGARITHMS TO FOUR PLACES OF DECIMALS. Including Logarithms of numbers and Logarithmic lines and tangents to single minutes; to which is added a table of natural lines, tangents and co-tangents. D. Van Nostrand, New York, 1883. Pp. 139. 50 cts.

We are indebted to Mr. W. F. Davis, Water Registrar, for the REPORT OF COMMISSIONERS ON INVESTIGATION OF WATER SUPPLY OF CITY OF BOSTON, MASS.

REPORT OF THE COMPTROLLER, CITY ENGINEER, AND OTHER OFFICERS OF THE CITY OF KANSAS, MO., December 31, 1882.

ANNUAL ADDRESS OF EDWARD FENNER, FIRST VICE-PRESIDENT OF THE NEW ORLEANS AUXILIARY SANITARY ASSOCIATION.

FOURTH ANNUAL REPORT OF THE BOARD OF HEALTH OF THE TAXING DISTRICT OF SHELBY COUNTY (CITY OF MEMPHIS), for the year 1882. By G. B. Thornton, M.D., President.

Notes and Abstracts

FROM REPORTS OF HEALTH OFFICERS, ETC.

An accident prevents our printing the usual Mortality Table in this issue. We will, therefore, furnish two tables next week.

BALTIMORE, MD.—There were 190 deaths in Baltimore during the week ending March 24, males 85, females 105; under five years 74, over 60 yearss 32. Annual rate calculated on the local estimates of the population 24.15; that for the white people being 22.20 and for the colored 35.53. Small-pox occasioned 13 deaths, measles one, scarlet-fever 11, whooping-cough one, croup two, diphtheria 15, diarrhœal diseases one, typhoid fever one, intermittent fever one, erysipelas and puerperal fever none, consumption 24, bronchitis five, pleurisy two, pneumonia 23, congestion of lungs two, and violence two.

DETROIT, MICH.—Dr. O. W. Wight reports 19 new cases of diphtheria and 19 of scarlet fever.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 27 new cases of scarlet fever, making 36 of this disease under treatment, and eight new cases of diphtheria, making a total of 12 on hand.

BOSTON, MASS.—C. E. Davis, Jr., reports 17 new cases of diphtheria, 22 of scarlet fever, and six of typhoid fever.

NEW YORK CITY.—The case of small-pox reported in the table is detailed by Dr. Jno. T. Nagle to have arrived from Bremen by the S. S. "Elbe."

HOLYOKE, MASS.—City Clerk M. J. Guffin reports the occurrence of two cases of small-pox.

PITTSBURGH, PA.—Dr. W. Snively reports three cases of small-pox.

LYNCHBURG, VA.—Dr. Thos. L. Wallen reports two cases of small-pox in hospital, but none in the city.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELLS' ISLAND.—Dr. T. M. Franklin, Superindendent, reports 1,341 insane patients remaining under treatment at the end of the week. There were 11 admissions, six discharges and three deaths during the week.

ROCK ISLAND, ILL.—G. G. Craig, M.D., Reports three deaths during the week, two of which were in persons under five years. Measles caused one of the deaths, congestion of the lungs one, and consumption one.

PROVIDENCE, R. I.—Dr. E. M. Snow in his report for the week remarks: "There seems to be nothing remarkable in the mortality for the week; but every one is conscious of something unusual and uncomfortable in the weather. This abnormal state of the atmosphere has existed in different forms all winter, and has been the cause of a great amount of sickness, though without any excessive mortality. We may hope that with the advent of milder weather the unusual sickness will disappear."

MICHIGAN.—Dr. H. B. Baker's report for the week ending March 17 shows the prevalence of influenza, bronchitis, rheumatism, neuralgia, consumption, pneumonia, intermittent fever and tonsilitis. Diphtheria was reported present at 16 places, scarlet fever at 18 places and measles at 14 places. No small-pox was reported in Michigan.

READING, PA.—The report of the Board of Health of the City of Reading, Pa., for the year 1882 has been received. The population is given as 45,750. The births for the year numbered 1,316 or an increase of 33 over the preceding year. The deaths numbered 890 including 57 still-births and 20 premature births. The annual mortality rate is given at 19.4 per 1,000. There were 386 cases of scarlet fever reported to the board during the year and of this number 93 proved fatal; the greatest mortality from this disease occurred in February. Cholera infantum carried off 58 children, diphtheria caused 15 deaths, typhoid fever 16, malarial fevers 26, pneumonia 36, and violence 34. Four cases of small-pox occurred during the year of which one proved fatal.

ONTARIO, CANADA.—During the week ending March 10 bronchitis influenza, anæmia, neuralgia and tonsilitis were the prevailing diseases. The *Provincial Bulletin*, notices with pleasure the appointment of a health officer by the City of Toronto, and hopes that this appointment is but one of many which will be made by municipalities during the coming year. During the week ending March 17 a considerable increase in the prevalence of influenza was noticed, and a very marked increase in that of measles.

MATANZAS, ISLAND OF CUBA.—Consul David Vickers announces, under date of March 16, the occurrence of a case of yellow fever which is expected to prove fatal. This is an unusually early appearance of the disease and the physicians fear great and fatal increase.

CARDENAS, CUBA.—Commercial Agent J. A. Nunez reports the absence of yellow fever during the week ending March 17.

VALPARAISO, CHILE.—Vice-Consul August Motter Jr. sends the report for the month of January which shows 516 deaths in a population of 120,000, males 269, females 247. Small-pox caused 65 of the deaths, fever 122, consumption 58 and diseases of the respiratory system 72.

CITY OF MEXICO, MEXICO.—During the week ending Feb. 11 there were 218 deaths; under five years 94, over 70 years 14. Small-pox caused one death, typhoid fever 14, whooping cough four, puerperal fever one, consumption 12, pneumonia and bronchitis 53. No deaths occurred from measles, scarlet fever, croup or diphtheria.

PERNAMBUCO, BRAZIL.—Consul H. L. Atherton reports for the weeks ending Jan. 29 and Feb. 5. During the former period seven deaths were caused by small-pox in a total mortality of 76, and during the latter 10 in a mortality of 72, population 109,300.

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ENGLAND.—Consul-General E. A. Merritt sends the Register-General's return for the week ending March 10. The annual rate of mortality in the 28 large towns of England and Wales average 23.0 per 1,000; it being lowest in Cordeff 15.6, and highest in Preston 33,4. Small-pox caused two deaths in London, one in Wolverhampton, one in Birmingham and one in Newcastle-upon-Tyne.

London.—Births 2,480; deaths 1,648. The former were 381 and the latter 169 below the average numbers in the corresponding weeks of the last ten years. Annual rate 21.7. The deaths included two from small-pox, 29 from measles, 19 from scarlet fever, 12 from diphtheria, 45 from whooping cough, two from typhus, 11 from enteric fever, nine from diarrhœa and 65 from violence.

SCOTLAND.—Consul J. A. Leonard, Edinburgh, transmits the return of the Registrar-General for the week ending March 10. The death rate in the eight principal towns was 26.4 per thousand of the estimated population. The lowest mortality was recorded in Edinburgh 19.2, and the highest in Leith, 32.0. The most fatal zymotic diseases were whooping cough and measles in Glasgow and whooping cough in Dundee.

Edinburgh.—Total mortality 87; rate 19.2; no deaths registered from small-pox, measles or diarrhœa. Scarlet fever caused two deaths, diphtheria six, whooping cough four, fever four, acute lung diseases 18 and violence three.

IRELAND.—Consul A. B. Wood, of Belfast, sends the return of the Registrar-General for the week ending March 3.

Belfast.—Mortality 128; rate 31.1 No deaths are recorded from small-pox, typhus or typhoid fevers or diphtheria. Measles caused one death, scarlet fever 14, whooping cough four, diarrhœal diseases two, consumption 21, acute lung diseases 32 and violence two.

Consul Wood sends also the returns of the Registrar-General of the births and deaths in the Dublin registration district and in 15 of the principal urban sanitary districts in Ireland, for the year 1882.

Dublin Registration District.—Births 10.073; deaths 9,699. The deaths were equal to one in 36 or to 27.8 per 1,000 of the estimated population as against an average rate of 26.4 for the preceding ten years. Of the decedents 4,704 were males and 4,995 females. No deaths from small-pox was registered during the year. Measles caused 567 deaths compared with an average of 187 for the ten years 1872-81. Only 37 deaths from scarlet fever were registered against 120 in the year 1881, and an average of 292 for the preceding ten years. Diphtheria caused 31 deaths, or four under the average. Whooping cough caused 81 deaths, or 82 below the average. The deaths registered as from fever numbered 248, being 68 under the average; of these 84 were caused by typhus. Diarrhœa and dysentery caused 247 deaths, or one over the average. Consumption caused 1,182 deaths as compared with an average of 1,026. Diseases of the respiratory system caused 2,114 deaths, of which 1,444 deaths were caused by bronchitis, 407 by pneumonia, and 61 by croup. Violence caused 237 deaths. Of the 9,699 deaths 3,317, or 34 per cent. were of children under five years of age, and 2,201 or 23 per cent. were of persons aged 60 years and upwards, including those of 1,056 persons aged 70 years and upwards, of whom 47 were stated to be nonagenarians, and one, a woman, was returned as 110 years old.

In the sixteen urban districts (including the Dublin District) with an aggregate population of 843.553, there were, during the year 1882, 25,038 births, or 29.7 per 1,000, and 21,886 deaths, giving a rate of 25.9 per 1,000. Sligo returned the lowest death rate, 19 2, and Kilkenny the highest, 28.1. Small-pox caused 97 deaths, 82 of which occurred in Belfast, measles 815, scarlet fever 312, typhus 268, whooping cough 206, diphtheria 74, enteric fever 224, diarrhœa and dysentery 677, consumption 2,824, diseases of the respiratory system 4,722, and violence 397.

PARIS, FRANCE.—The *Bulletin* for the week ending March 6, records a total of 1,140 deaths; males 652, females 488; under five years, 347; over 60 years, 230. Annual rate 26.45. Typhoid fever caused 29 deaths, small-pox 10, measles nine, scarlet fever five, whooping cough seven, croup and diphtheria 46, erysipelas eight, puerperal infection four, consumption 245, bronchitis 49, pneumonia 95, and violence 23.

On March four there remained under treatment in the hospitals 84 cases of small-pox, 370 of typhoid fever, and 50 of diphtheria.

The number of deaths registered as having occurred from consumption during this week is greater than in any weekly period since Feb. 16, 1882.

RHEIMS, FRANCE.—Consul Jno. L. Frisbie's report for the week ending March 3, shows 57 deaths; under five years, 21; over 60 years, 12. No deaths are recorded from scarlet fever, measles, small-pox, whooping cough, diarrhœal diseases or erysipelas; but puerperal fever caused one death, croup and diphtheria five, typhoid fever one, consumption eight, pneumonia four, bronchitis four, and violence three. Population 93,823.

BORDEAUX, FRANCE.—Consul G. W. Roosevelt sends report for the month of February, showing a total of 488 deaths (including 29 still births), in a population of 221,305. No death was reported from small-pox, measles or scarlet fever. Typhoid fever occasioned 14 deaths, croup and diphtheria nine, whooping cough two, puerperal fever three, erysipelas one, dysentery two, consumption 83, acute bronchitis 16, congestion of lungs nine, pneumonia and pleurisy 34, and violence 12.

GIBRALTER, SPAIN.—Consul H. J. Sprague reports three deaths from small-pox in a total mortality of nine, during the week ending March 4.

BRUSSELS, BELGIUM.—During the week ending March 3 there were 297 births and 205 deaths in the city and suburbs, the former being equal to an annual rate of 36.2, and the latter to a rate of 25.2. Of the deaths, 83 occurred among children under five years. No death was reported as occasioned by scarlet fever, typhoid or typhus fevers, or diphtheria. Small-pox caused five deaths, measles two, croup three, whooping cough three, diarrhœal diseases 17, bronchitis and pneumonia 29, and consumption 31.

STOCKHOLM, SWEDEN.—Consul Elfwing's report for the week ending Feb. 24, states the mortality to have been 92, or at the annual rate of 27.5 per 1,000. Of the total 50 were males and 42 females; 42 under five years of age, and 14 over 60 years. No death is recorded from small-pox, whooping cough, croup and diphtheria, puerperal fever or erysipelas. Measles occasioned 14 deaths, scarlet fever five, typhoid fever one, diarrhœa six, consumption eight, bronchitis four, pneumonia 14, and violence one.

During the week ending March 3, the following cases were reported by the physicians:—Measles 61, scarlet fever 24, whooping cough seven, erysipelas eight, diphtheria eight, croup one, typhoid fever one, diarrhœa 21, tonsilitis 15, pneumonia seven, and bronchitis 103.

COPENHAGEN, DENMARK.—There were 136 deaths during the week ending Feb. 27, equivalent to an annual rate of 24.76 per 1,000. Children under five years were the decedents in 54 cases. No death was registered from small-pox, measles, scarlet fever or erysipelas. Diphtheria caused two deaths, croup one, whooping cough six, typhoid fever two, diarrhœal diseases four, puerperal fever one, consumption 22, pneumonia nine, pleurisy one, acute bronchitis six, and violence five.

During the week the following cases were reported: Scarlet fever 24, diphtheria 12, croup two, whooping cough 95, typhoid fever three, diarrhœa 87, erysipelas 21, puerperal fever one, bronchial catarrh 376, pneumonia 60, and tonsilitis 139. No case of measles was reported.

VIENNA, AUSTRIA.—Consul-General Weaver's report for the week ending March 3, shows 439 deaths, which number is equivalent to an annual rate of 30.4 per 1,000. Small-pox caused three deaths, measles none, scarlet fever six, diphtheria four, whooping cough seven typhoid fever two, consumption 109, and acute lung diseases 84. The decedents in 159 instances were under five years of age.

ST. PETERSBURG, RUSSIA.—Consul-General Stanton's report for the week ending Feb. 24, shows a total mortality of 718 in a population of 939,525; males 409, females 309; under five years 305; over 60 years 60. Small-pox occasioned 14 deaths, and fevers 35.

On Feb. 25, there remained under treatment in the city hospitals 1,163 cases of fever, 68 of small-pox and 1,277 of venereal diseases.

RIGA, RUSSIA.—Consular-Agent Niles Bomholdt reports 492 births and 368 deaths during the month of January, as compared with 589 and 411 during the preceding month. There were 45 deaths registered as owing to inflammation of the lungs, 39 to consumption, 36 to convulsions, 18 to croup, 18 to typhoid fever, nine to diphtheria, seven to scarlet fever, five to small-pox, three to whooping cough, two to measles, two to pueperal fever, one to diarrhœa and 183 to unregistered causes.

GERMANY.—During the fourth quarter of the year 1882, there occurred 49,647 deaths (exclusive of the still-born) in 173 cities and towns of the German Empire, varying in population from 12,234 in Baden-Baden to 1,156,382, and aggregating 8,573,094. The births for the same period numbered 76,370. The former is equal to an annual rate of 35.6 and the latter to one of 23.2 per 1,000. Of the deaths 22,901 occurred in children under five years of age, and 8,902 in persons over 60 years. Small-pox caused 19 of the deaths, measles 685, scarlet fever 1,298, diphtheria 2,346, croup 341, whooping cough 675, typhoid fever 859, typhus seven, dysentery 48, puerperal fever 279, consumption 6,855, bronchitis and pneumonia 3,915, other acute diseases of the respiratory system 1,236, diarrhœal diseases, in addition to dysentary, 2,919 and violence 1,274.

An inspector of the Brooklyn Health Department reports the abandoned brewery on Ten Eyck street, near Union avenue, a part of which is used as a "station" by the Salvation Army, in an unsafe sanitary condition, specifying that the sewer pipes are open and exposed, the cellar wet from roof water (the leaders discharging into the same), and that the unoccupied portions of the building are in an unclean and offensive condition from refuse.

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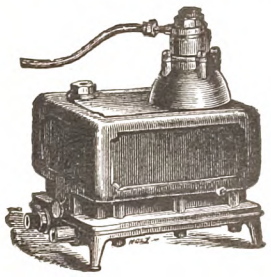

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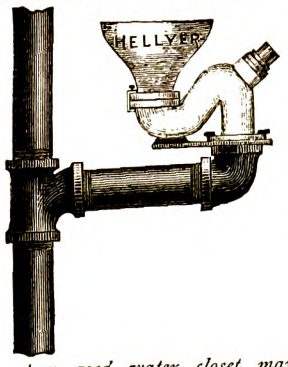

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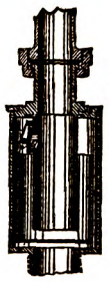

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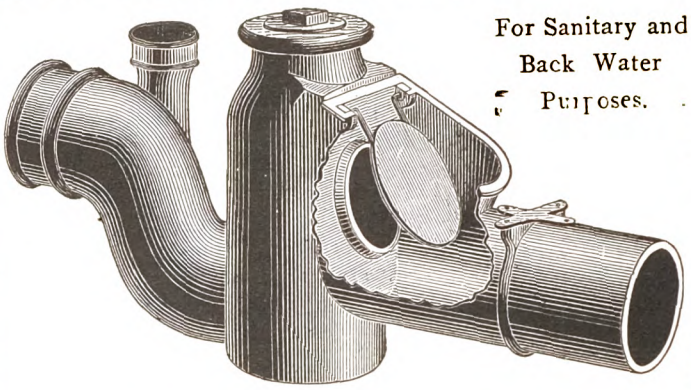

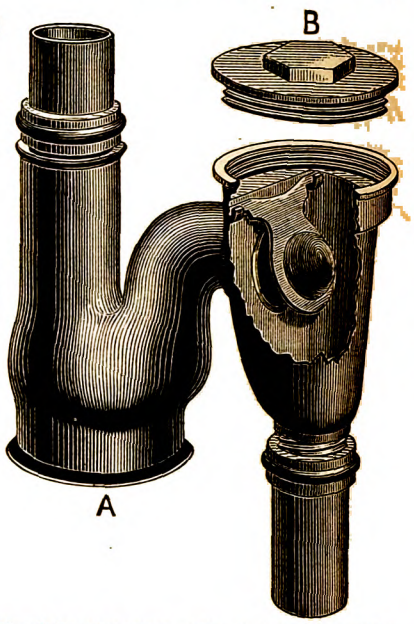

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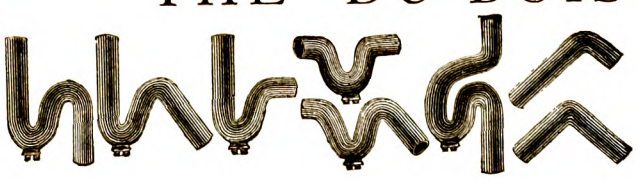

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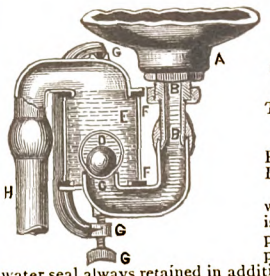

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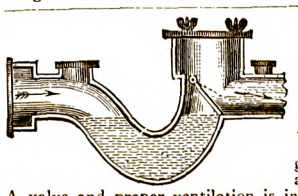

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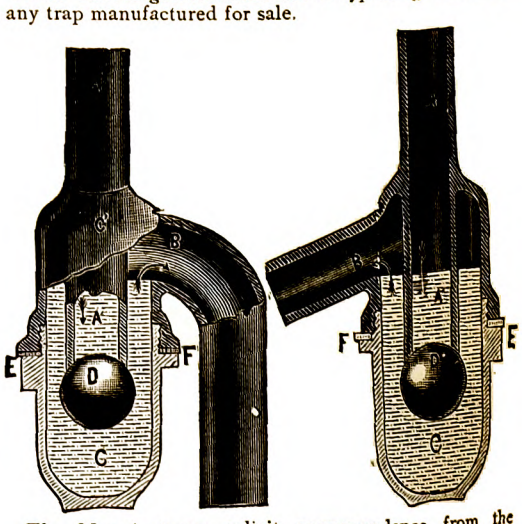

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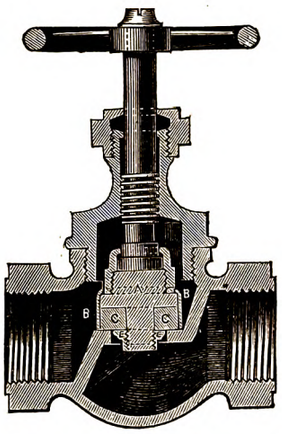

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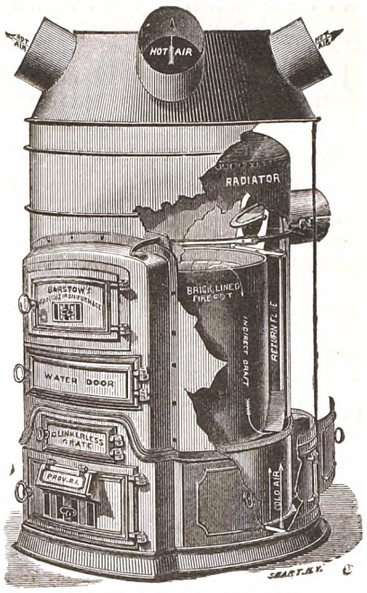

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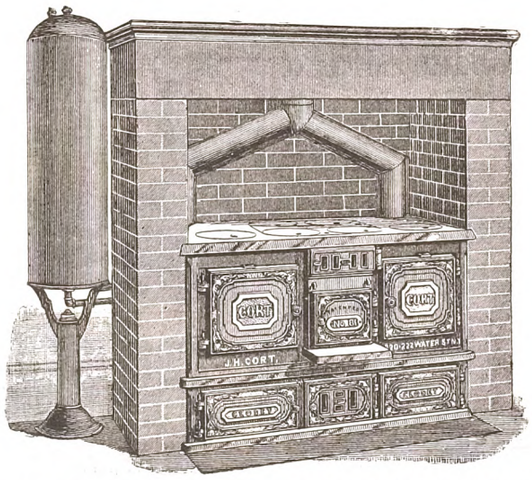

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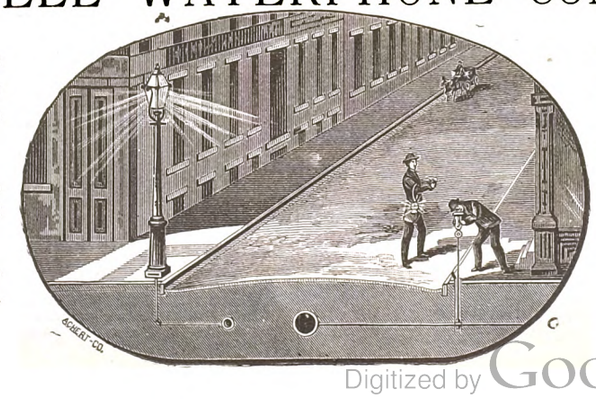

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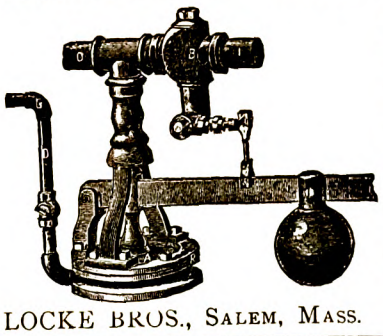

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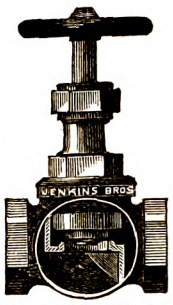

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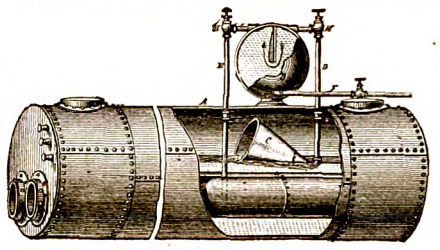

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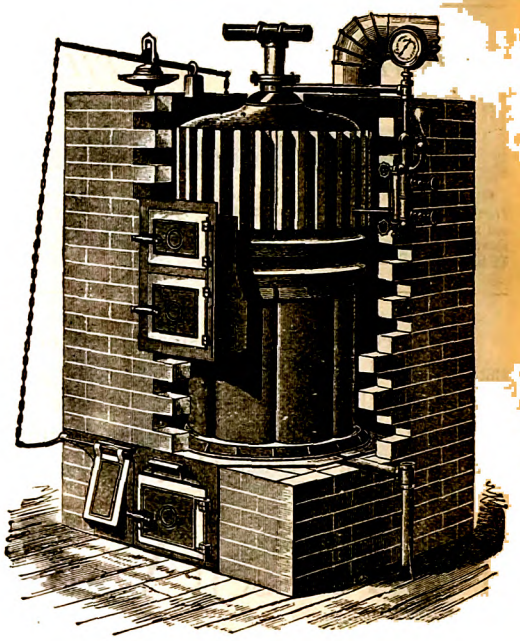

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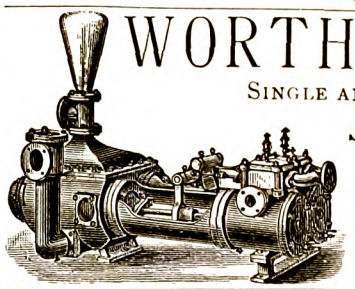

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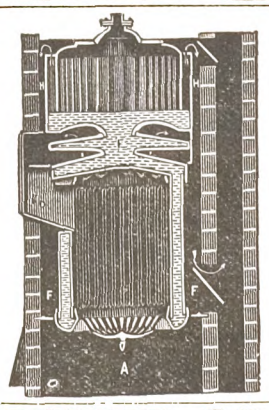

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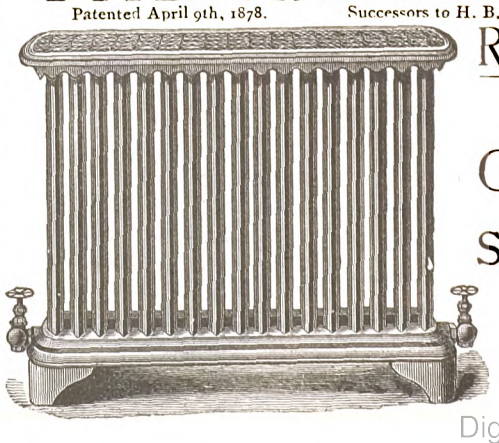

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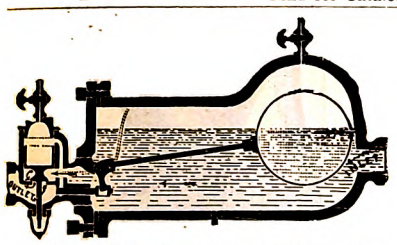

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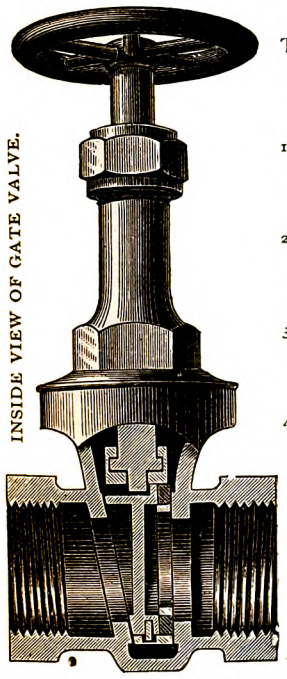

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The advantages these valves possess over all other gate valves, are—

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4th. They do not have to be taken from their places to be repaired.

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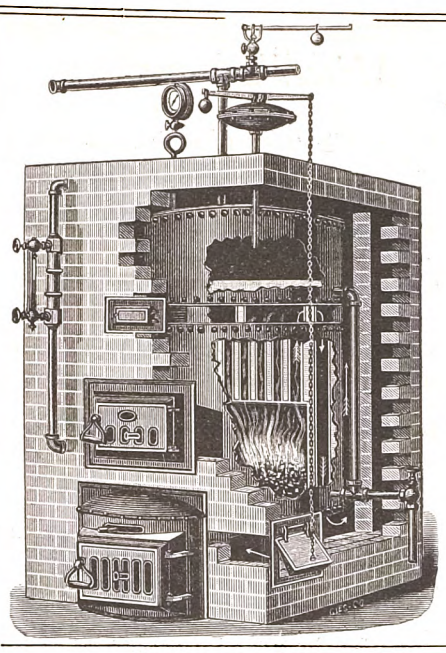

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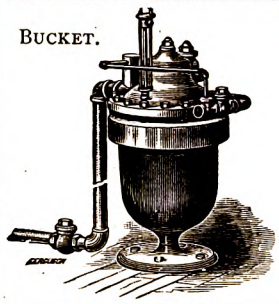

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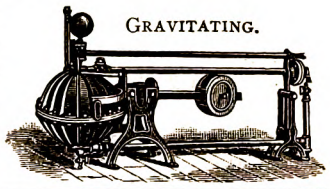

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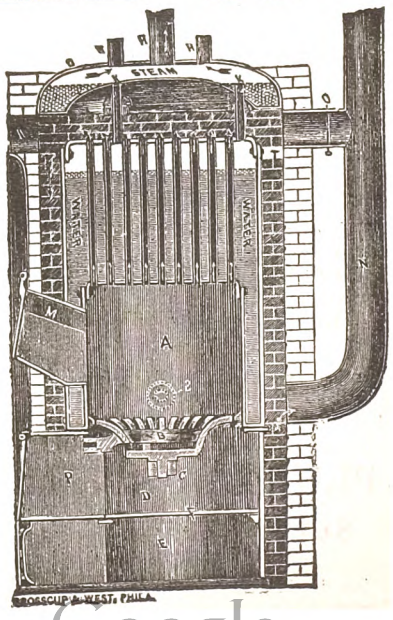

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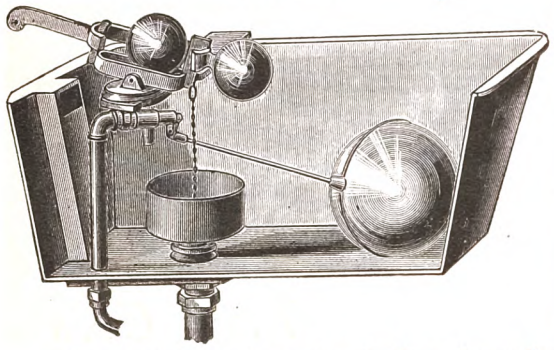

When pull is used, whether held or instantly released, a uniform length of wash is obtained.

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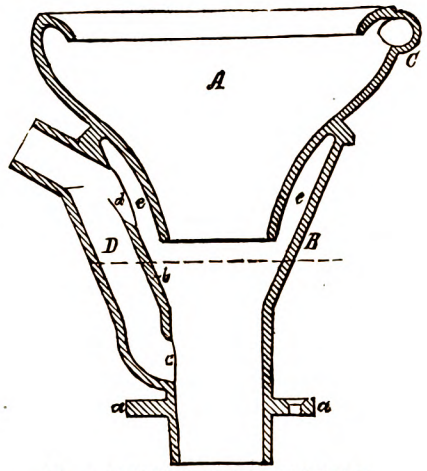
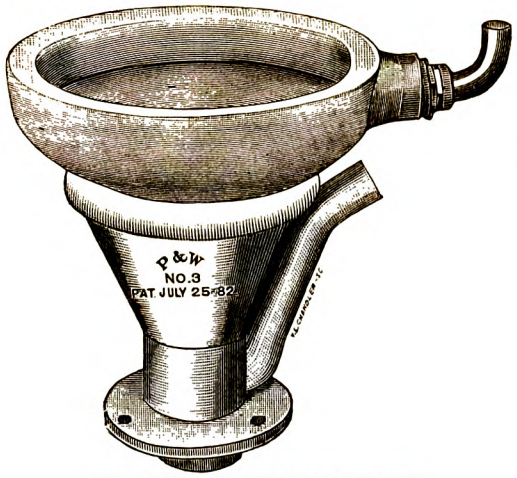


No. 2 VENTILATED HOPPER

Above is section of No. 2 Hopper, showing method of ventilation, furnished with French Bowl for direct pressure.



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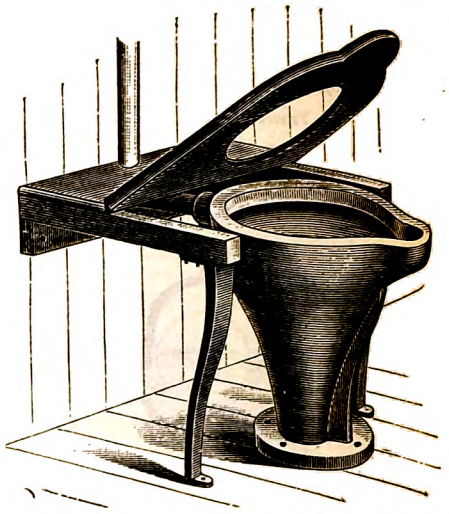

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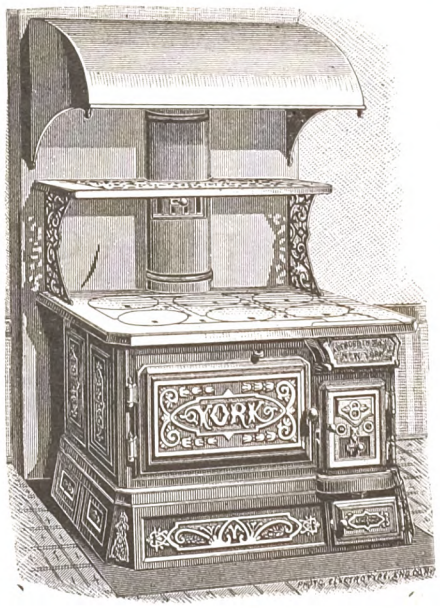

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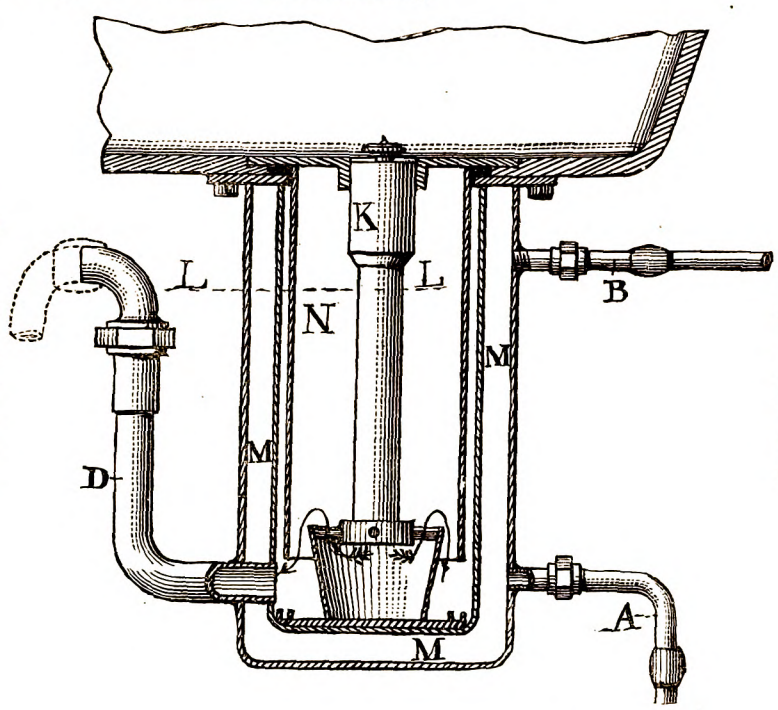
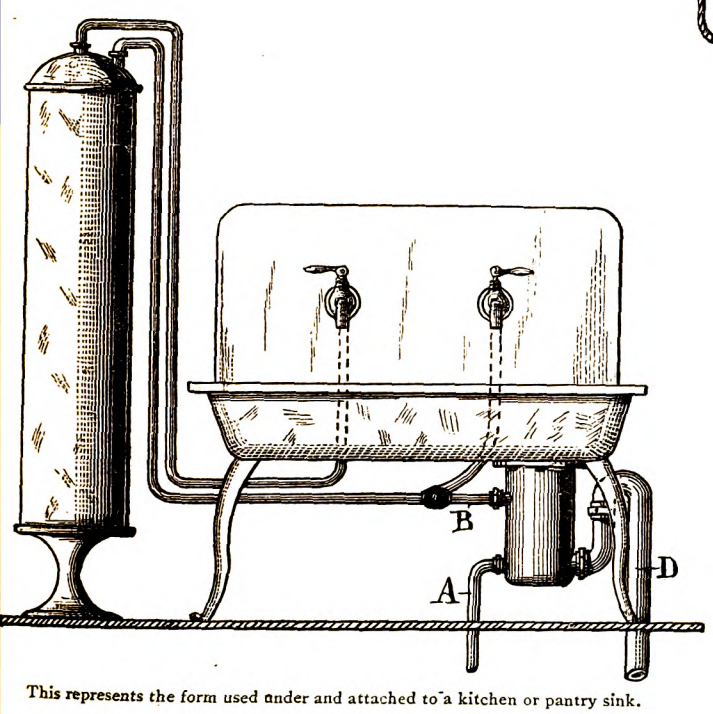
Mr. Tucker informs us that he has, among others, thus far fitted them up in the following buildings: Residence of Cornelius Vanderbilt, Esq., Residence of the late Robt. L. Stuart, Esq., Residence of Theo. Havemeyer, Esq., and Restaurant in the Mills Building.

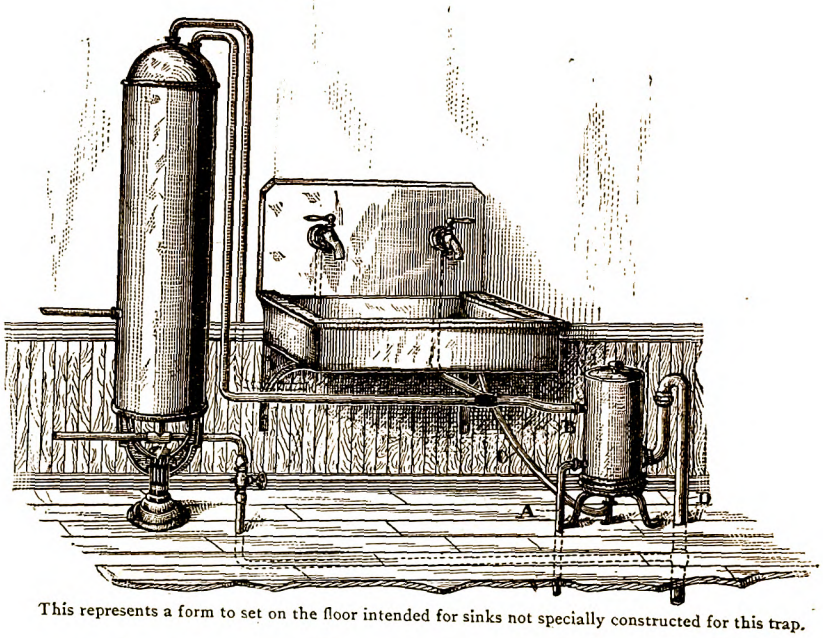
The grease is retained in this Grease Trap in the following manner:

The waste water passes down the tube *K*, following the course shown by the arrow into the waste pipe *D*. The depth of the standing water is indicated by the line *L*. Cold water circulates in the jacket *M*. It enters from the cold water pipe *A* and passes out at *B*; this has the effect of chilling the grease in the compartment *N*. The grease being on top, naturally increases in depth until it occupies this space, when it prevents the water passing into the pipe *D*. This will be indicated by its failure to run off. The chamber *N* with the tube *K* can then be lifted out, and the cake of grease removed. The parts may then be put back and again used until it is necessary to repeat the operation.





This represents the form used under and attached to a kitchen or pantry sink.



This represents a form to set on the floor intended for sinks not specially constructed for this trap.

FIGURE 4. Shows the shell of the trap with the grease collector removed.

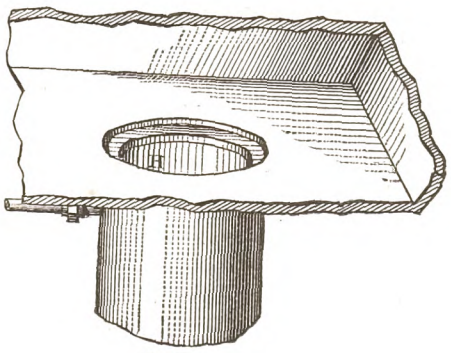


FIG. 4.

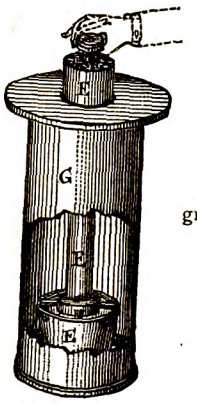


FIG. 5.

FIGURE 5. Shows the removable part of the grease collector.

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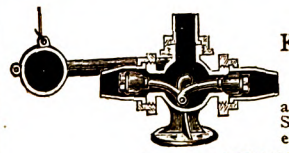

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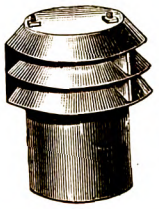

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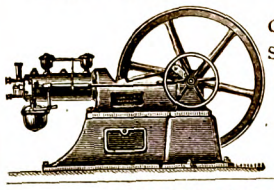

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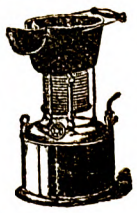

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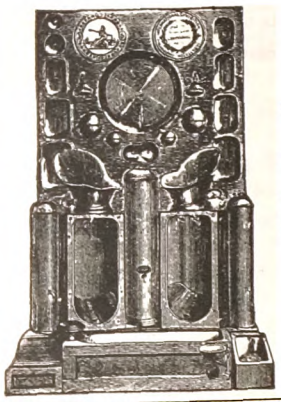

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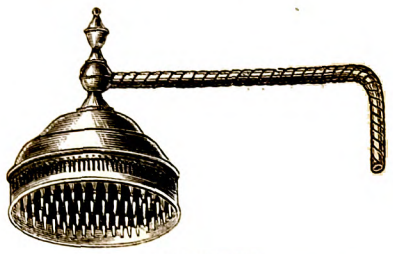

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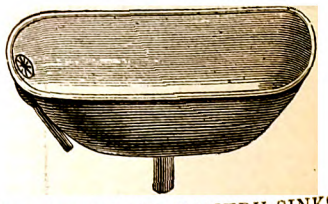

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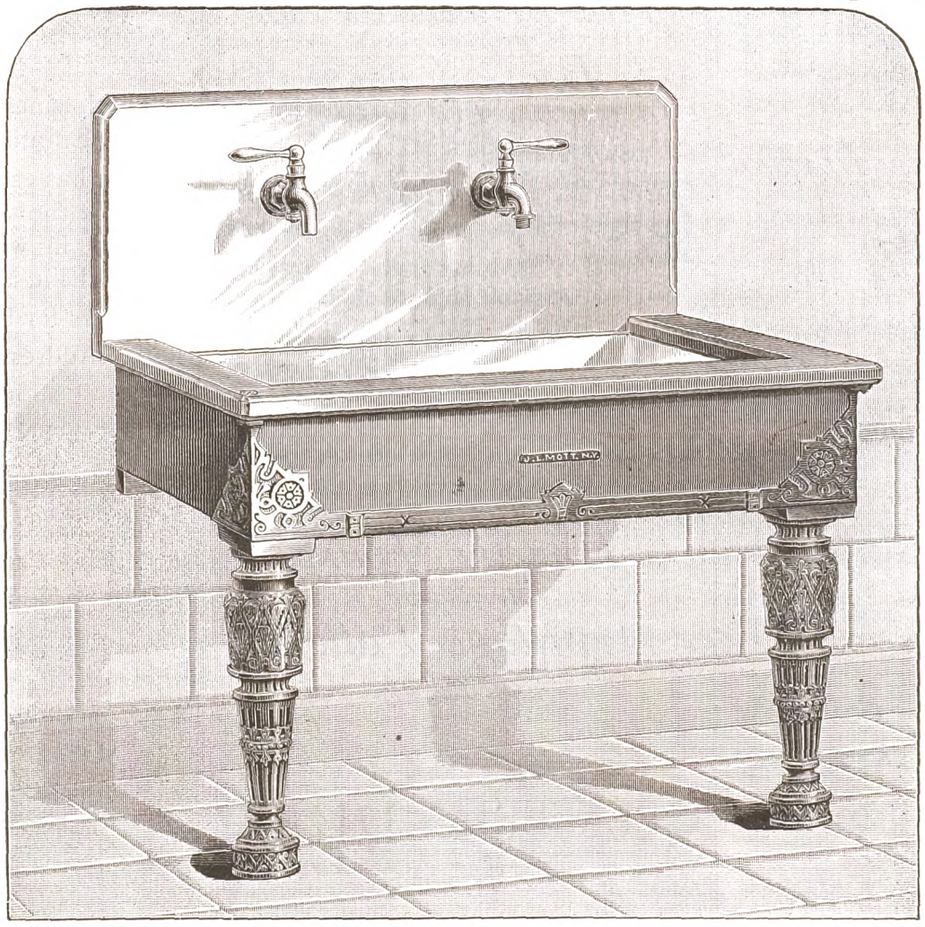

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Peter Cooper, whose remains were last week carried to the tomb, died honored, loved and mourned by the entire community. Public feeling at this time when contrasted with that on the occasion of the deaths of other rich men in recent years, is full of suggestiveness. In an age of wealth, extravagance and ostentation, the career of such a man reminds us that things are not as bad as they seem, and that wealth may be a great boon when intrusted to such a steward as he was. The lesson of his life and the spectacle at his death, we trust, will prove an incentive to others of our wealthy citizens to go and do likewise.

It is impossible to estimate the service he has rendered this community in founding and maintaining the Cooper Union, where facilities for obtaining technical instruction are afforded the masses, and multitudes have been enabled to earn a livelihood. This country needs many such institutions, and this seems to be a good time to suggest to those who have accumulated wealth and are considering how they may do good with it, that they examine into the working of the Cooper Union, the Massachusetts Institute of Technology, at Boston, and the Stevens Institute, at Hoboken. These will indicate to them practical methods of rendering for all time a real service to individuals and communities.

The best tribute to the memory of the good man that has gone is to follow his example. It has been well said, "he was born of the people and never forgot his parentage."

DAMS, AQUEDUCTS AND PIPES.

The various class journals published in New York, are discussing the water supply question, each from its own stand-point. When we speak of class journals, we include every daily and weekly newspaper in the city. The partisan press is examining the subject from the political point of view, each paper anxious that the political party with whose views it does not coincide, should not have an undue share of the patronage which the expenditure of fifteen or twenty millions of dollars involves.

The medical journals dwell on the relative purity and wholesomeness of waters stored or freshly gathered, waters from limestone, gneiss or granitic formations, and waters flowing over pebbly beds or peaty meadows.

Now comes forward the *Engineering and Mining Journal*, which thinks that there is "nothing like iron," and wants to know why masonry dams and aqueducts and tunnels in the solid rock should be considered at all, when iron pipes can be used to bring water from remote regions, and is "surprised that the commission has not even referred to such other means as syphon pipes, so largely in use elsewhere, for conveying water."

We know nothing of the processes of reasoning by which the Mayor's commission was led to the decision as to what should and what should not be referred to in its report, but we imagine that it did not deem it essential or advisable to confuse the minds of legislators and the general public by reviewing in detail the suggestions of every advocate who came before it, and particularly deemed it unadvisable to dwell on schemes involving unnecessarily great expenditure.

The bold methods of the California engineers in carrying water supplies many miles across deep gorges and around precipitous mountains, in light wrought iron pipes, with very successful results, excite the enthusiasm and inflame the imagination of many a poetic dweller in our matter-of-fact and plodding Eastern communities, and they wonder why our civil engineers do not also strike out in some new path and project some work that will fire the public heart. And yet, when anything apparently bold, but based on sound scientific principles, and fortified by facts and figures, is presented, they are discontented because some other method, inapplicable under the circumstances, is not proposed.

The need of New York City is a plentiful supply of water. The engineers who have examined the subject propose to furnish that water through a nearly "bee line" tunnel conduit of 12 feet clear diameter, 26 miles long, and deep enough below the surface to be free from accident or wilful damage. To furnish the same amount of water through wrought iron pipes, would require the laying of 32 lines of pipe of 3 feet diameter, the largest size yet used for wrought iron conduits, for at least 36 miles, on a circuitous route, and crossing a number of deep ravines. Such pipes would necessarily be laid on or near the surface of the ground and be liable to be maliciously injured.

It is not a difficult matter to discover that the furnishing and laying of 200,000 tons of wrought iron pipe, would be a heavier burden on the tax payers than the construction of the proposed tunnel conduit, not to speak of the probable complications, resulting from combinations in the iron market over so large an order of material for city use.

The *Journal's* astonishment at the omission of iron from the plans, is supplemented by its fears for the projected dam.

It says, "while no engineer will question the possibility of building a dam capable of withstanding a pressure of 230 feet, or say 100 pounds per square inch, yet under that pressure no common masonry can be counted on to prevent

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filtration, and no dam that leaks can be considered perfectly safe." It is not too much to say, that in this sentence the facts are distorted and the argument mis-stated. Every description of the proposed dam at Quaker Bridge, states that its height above ground at the highest point will be about 180 feet. In the middle of the valley it may be necessary to excavate a trench, perhaps as much as 100 feet deep at points, which will be filled up partly with solid masonry, probably two hundred or more feet wide, and the rest filled with puddled earth to the natural surface. On this masonry foundation the dam will be built, and the pressure of water it will have to sustain, will be less than 80 pounds per square inch at its base. But suppose some water does filter through it, what harm can it do? The percolation through the joints between heavy blocks of stone cannot wash out those stones. It is not true that a dam which leaks is unsafe, provided that the water passing through does not carry with it the material composing the dam. A leaky earthen dam is dangerous, but a masonry dam in which any water that may by any means find access to the joints is given free exit on the lower side, is safer than one in which the attempt is made to keep the lower face dry. The *Journal's* neat aphorism is "popular science" perhaps, but poor engineering. As for relative danger of injury from breaks, when masonry structures and light iron pipes under great head, are compared, the risk of danger is infinitely greater in the case of the pipes. A stone dam as large as that proposed could not give way all at once, but a single break in one of the 32 pipes at one of the many syphons between the Croton River and the city, would carry desolation sudden and unavoidable down the whole valley in which the burst might occur, and these valleys, be it remembered, are occupied by residences and improved high priced property, unlike the short valley from the Quaker Dam to the Hudson River.

But after all, the *Journal* practically calls attention to a private enterprise, which has been set on foot by some of those mysterious "responsible parties," who are always standing ready to make a contract to furnish something to a great corporation, at extremely reasonable rates. The proposition in this case is to furnish a certain quantity of water from the Ramapo River, crossing the Hudson River by iron pipes, and delivering the supply under some 250 feet head at the city line, "which would probably be sufficient to dispense with steam fire engines. This pipe line plan is cheap and could be completed within a year." Now, with all respect to the "responsible" backers of this scheme, this talk is all nonsense in the present condition of affairs. What New York wants now, is to make provision for the future supply for a good many years, and to own the water, not rent it from a speculative corporation. There are cases where it is advisable for a municipality to allow private enterprise to furnish water as it does gas, making the consumer directly responsible to the owner; but it would be eminently unwise for the city to purchase its water at wholesale from parties whose interest it would be to have as much used as possible, and to sell it at retail to consumers whose desire is to waste the most and pay the least.

In this case the Ramapo source of supply is too limited to be of avail for what New York wants. It is, moreover, directly tributary to the supply of the enormous population congregating on the west shore of the Hudson River opposite New York, the great New Jersey suburb of the metropolis. Even if the legal complications, which are already threatened in connection with this suggested curtailing of the sources whence this district must draw its water, can be averted, it seems to us that a sound public policy would avoid the unnecessary interference with other States, when within our own State an ample water-shed exists, already largely appropriated for the purpose. With the habits of waste which exist, and the leaky condition of pipes and fittings, an increase of the head under which water is supplied would not materially relieve the deficiency. The leaks must be stopped, and we believe that they can and will be as soon as definite plans for the increased supply are decided upon, and the anxiety of the officials to secure charge of the new works removed. Until that question is settled, there will be no systematic effort to make the best of what we have.

In considering the question of who should decide on the plan for an increase in the water supply which is best for the city, we regret to see a suggestion that the matter be submitted to the American Society of Civil Engineers. This is all wrong. This representative Society of Engineers was not organized for, and never should be debased to the gratuitous discussion of special projects, nor should it be brought into the arena of politics. The adoption of plans and the selection of men to carry them out, are not the proper functions of an association of scientific men, the members of which are scattered from Nova Scotia to Japan and are dependant upon their scientific knowledge and experience for their livelihood, and who belong to the society, not for the pecuniary profit it may bring, nor with the purpose of electioneering for nominations to office, but for the professional and social advantages they may derive from intercourse with their fellows, unhampered by the feeling that each man he meets or addresses may be a rival, seeking a weak spot in his armor or an opportunity to pilfer a good idea. The American Society of Civil Engineers has shown itself before now to be jealously guardful of its true exalted position, and we feel sure that its members would, with one accord, decline to have it made an arbiter on special professional questions.

Governor Cleveland's veto of Senate bill 134, amending Chapter 512 of the laws of 1879, giving to gas companies the right to use electricity instead of gas for lighting, is an eminently wise one. Ostensibly this bill appears to be in the interest of such gas companies as may hereafter desire to substitute electricity for gas on account of competition with the electric light companies. In reality it gives to corporations furnishing electricity for light, heat or power, enormous privileges in respect to private property, and it is questionable whether such gas companies as might wish to use electric lights would not be prevented by its terms from so doing. For Section 1 of this bill so amends the original law that it recognizes only "corporations duly organized under the laws of this State for manufacturing and using electricity" for the above-mentioned purposes, and Section 2 expressly mentions these corporations as the ones to which the powers contained in the act are granted. We are unable to learn that the gas companies have had any interest in this bill, or have been in any way its promoters. They are either indifferent or hostile to it. So far as we can judge, the gas companies are not now seeking any legislation of this character, though a measure permitting them to use electricity may be hereafter advocated by them.

Aside from this apparent duplicity, the measure is objectionable for the extraordinary powers it gives a corporation over private property. According to its terms, a company may lay wires or erect fixtures over any private land, the only right reserved to the owner being that, in case of dispute as to the damage done, the County Court shall appoint three commissioners, who shall assess the damage, and this assesment constitutes the *annual rental* for the use of such property by the company. Instead of such annual rental a gross sum may be named as compensation for permanently allowing the fixtures to remain. It is also to be observed that this bill gives these powers over the entire State to any company organized in any part of the State. In view of these facts the veto is an important service rendered to the public by the Governor.

The daily press of this city, in noting the recent outbreak of typhoid fever on Washington Heights near Trini y Cemetery, stated that the Board of Health Inspectors reported the drainage of the district to be perfect and the sanitary condition of the houses inhabited by the persons who contracted the disease excellent. These statements are incorrect; while it is true that the investigations have not thus far resulted in the discovery of the source or means of transmission of the disease, the drainage of the locality where the greatest number of cases occurred is by no means perfect, and the plumbing of one of the best houses containing the disease was conspicuously bad. The investigations of the Board of Health inspectors are being continued, and it is hoped that they will be successful. The Sanitary Superintendent promises to make public in due time a report on the subject, which we look forward to with interest.

LETTERS TO A YOUNG ARCHITECT ON VENTILATION AND HEATING.

BY JOHN S. BILLINGS, SURGEON, U. S. A.

No. XLV.

In my last letter was described, with illustrations, the arrangements for ventilation and heating of the Barnes Hospital near Washington, D. C. Referring to this for dimensions of flues, ducts, etc., I will now give some observations upon the observed results. These are taken from a report which was printed for the use of the Trustees of the Johns Hopkins Hospital, in Baltimore, but which was never published and is now rare. The observations were made and reported by Surgeon D. L. Huntington, U. S. Army, to whose superintendence much of the success of the system was due.

The following are instances of experimental use of the fan:

June 7. External air 75° F.; 5 P.M., temperature of air supply duct 68° F., 20 lbs. steam; 120 revolutions of fan per minute.

Velocity of air at throat of duct (40 square feet area) 1,350 feet per minute, at nearest inlet into ward:

1st story	(100 feet from throat)	450 feet per minute.
2d "	118 " "	420 " " "
3d "	132 " "	340 " " "

At most remote inlet into ward.

1st story	(298 feet from throat)	410 feet per minute.
2d "	315 " " "	220 " " "
3d "	331 " " "	139 " " "

On this trial all registers were open, also all doors, windows, and ventilating outlets, the resistance to the fan being reduced to a minimum.

Nov. 1st. Temperature of external air 45° F., of duct 46° F. 20 lbs. steam; 120 revolutions of fan per minute.

Velocity of air at throat of duct 1,320 feet per minute at the nearest inlet to ward.

1st story	(same distance as above)	530 feet per minute.
2d "	" " "	360 " " "
3d "	" " "	269 " " "

At most remote inlet into ward.

1st story		750 feet per minute.
2d "		500 " " "
3d "		298 " " "

In this experiment all windows and doors were closed, the ventilating registers and outlets being open.

It will be seen that in the first experiment the pressure of the air as indicated by the velocity was greatest at the inlets nearest the fan, while the reverse was the case in the last trial. The direction and force of the prevailing wind also has a very considerable influence on the movement of air through the fan and in the duct. Dr. Huntington remarks that "A long series of experiments at different seasons of the year have all yielded harmonious results. Beyond a velocity of from 800 to 900 feet per minute in the main duct, the effective force of the air is much impaired, and the result usually seen at the inlets nearest the fan is a lessened current. One general rule in working the fan is to use 15 lbs. of steam and not over 60 revolutions per minute, equal to from 400 to 600 feet per minute in the duct; this gives all the air needed for the building and brings the consumption of fuel to its

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est point. With this velocity air enters the ds at the rate of from two to four feet per ond."

A specially interesting experiment was made one of the wards on the night of Nov. 28, ich is thus reported by Dr. W. M. Mew, who de the air analyses. Ward B (for 12 beds) ntained 11 patients; the ordinary ventilation s going on.

Ward D had 12 beds; all occupied. All the tlets had been closed for 35 minutes before e first experiment, in order to make the air oroughly impure, which was accomplished, as shown by the high percentage of carbonic id obtained.

The second experiment was made in the same ard just ten minutes later, during which time e outlet and inlet flues were open and the fan aking 60 revolutions per minute.

It will be seen from the following table that e use of the fan in this way for ten minutes ade the very impure air of the ward nearly as ure as the outer air:

Air, whence taken.	Temperature. Dry bulb.	Temperature. Wet bulb.	Difference.	Relative Humidity.	Vols. of CO_2 in 10,000.
Outside	49° F.	45° F.	4	73	3.05
Ward B	68° F.	57° F.	11	49	6.35
Ward D, 1st exper.	77° F.	61° F.	16	38	11.23
Ward D, 2d exper.	80° F.	66° F.	14	....	3.75

At the time of this observation there was very little wind, the barometer was 29.72, the temperature in the aspirating chimneys was 79° F., and the average velocity of the upward current in them was 120 feet per minute.

The amount of anthracite coal used for heating the hospital with the external temperature at 39° F., averaged 1.184 lbs. for 24 hours.

The following table shows the observations made of the heating and ventilation of this hospital during the first week in December, 1877. All velocities are stated in feet per minute, and each reported observation is the mean of three trials:

December.	1	2	3	4	5	6	7
Barometer	29.804	30.268	30.230	30.062	29.615	29.771	30.125
External Temperature	38°	31°	33.5	37	53	40	36.5
Wind, direction and force	N. W.	N.	N. W. S. E.	S.	S. W. 0–4	N. W. 4–6	S. W. 1–4
Relative humidity of external air	87	92	66	78	78	58	57
Aspirating chimneys, East. Temperature of chimney	69	75	76	75	75	75	75.5
Aspirating chimneys, East. Velocity of air current	186	280	375	346	326	400	444
Aspirating chimneys, West. Temperature of chimney	70	73	74	73	74	76	73
Aspirating chimneys, West. Velocity of air current	126	150	280	293	150	353	264
Outflow from foul air registers, east wing	200	150	120	139	120	190	240
" " " west wing	210	153	146	113	106	180	213
Inflow of fresh air, east wing	150	205	173	190	306	166	189
" " " west wing	110	166	153	166	340	160	220
Gauge of Heating Furnaces	135	142	142	140	135	140	143
Temperature of hot air at registers of wards, east wing	97	98	102	102	104	103	96
" " " " " west wing	100	105	106	93	100	108	102
Average temperature of wards at floor east wing	71	73	74	71	72	71	72
" " " at centre, east wing	73	75	74	73	74	75	76
" " " at ceiling, east wing	73	76	76	75	75	73	73
" " " at floor, west wing	72	70	72	74	74	72	74
" " " at centre, west wing	72	....	71	69	72	72	74
" " " at ceiling, west wing	74	72	73	74	74	74	77
Temperature of distal foul air boxes, east wing	72	73	73	70	74	76	73
" " " " west wing	72	70	75	73	77	74	73
Average relative humidity of house	73	71	74	72	75	72	74
	59	45	44	54	56	52	47

Remarks:—December 1. Clear and cool; both furnaces going. Fan not running.
December 2. Calm and cool; both furnaces going. Fan not running.
December 3. Cloudy and still; both furnaces going. Fan running moderately.
December 4. Cloudy with rain; fan running. Both furnaces going.
December 5. Warm and muggy; W. furnace discontinued. Fan not running.
December 6. Fan not running. W. furnace discontinued.
December 7. Clear and cool; fan not running. W. furnace discontinued.

GAS FITTING IN AN OFFICE BUILDING.

Topeka, Kan., *March* 5, 1883.

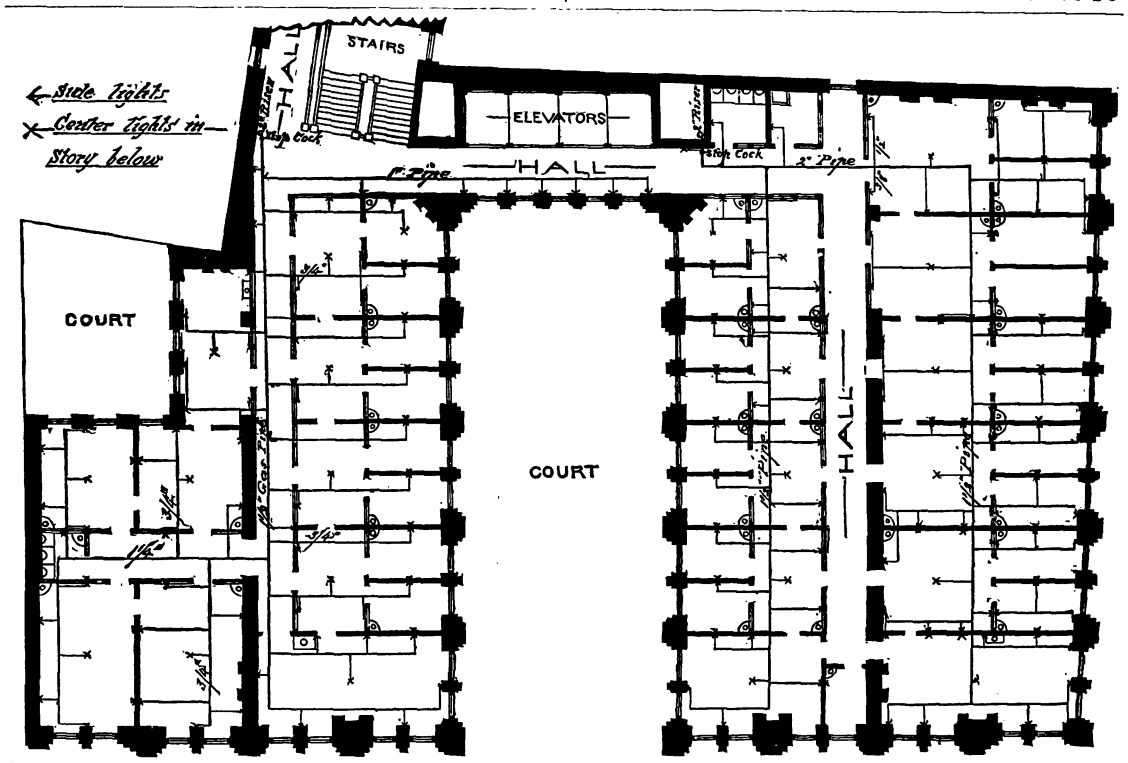
To the Editor of The Sanitary Engineer:

I am building an office building. I read your queries and replies every week, and would be pleased if you could give me an idea about locating my gas fixtures and meters for the different offices. I have looked over the Mills Building drawing but could not gather much information from it. A drawing in your paper would be thankfully received. Folks out here are not posted much in such matters.

Respectfully yours,

August Anderson.

At the above suggestion of our correspondent, we have had prepared another plan of the eighth floor of the Mills Building, showing the location of gas pipes and fixtures. We suppose the drawing to which he refers was that showing the electric light wiring system, found in our issue of Dec. 21, 1882 (Vol. VII., p. 53). Though the general methods of distribution of gas and electricity in this building are much alike, the plan of one system would hardly serve in place of the other for practical purposes. We have chosen the same floor of the same building in order that the two systems may be directly compared. For the particulars of this description we are indebted to Mr. John Tucker, the foreman in charge of the gas fitting, which was done by Mr. T. J. Byrne.



The whole number of lights provided for in the whole building is about 5,200. The supply pipe from the street to the meter in the cellar is four inches in diameter. But one meter is used in accordance with the practice, now generally adopted in new office buildings in this city, of including the gas bill in the rent. The former plan of having a meter in each office or suite of offices was objectionable on account of the greatly increased danger and annoyance of escaping gas, and the liability of admitting thieves in the guise of meter takers. The omission of separate meters also simplifies the system of distributing pipes and reduces the amount of pipe.

The meter is located near the foot of the vertical main or "riser," shown on the plan, near the rear left-hand corner. Its outlet is 4-inch and from this are taken 3-inch branches to the two risers which supply the main building. Both are in the rear of the building, the one above mentioned being in a recess in the brick wall on the left of the hall leading to a wing (not shown) in the rear, and the other in a corner of a shaft containing the pipes, cables, etc., on the right of the elevators on the back side of the main building. Each is 3-inch to the first story, thence 2½-inch to the sixth, and 2-inch the rest of the way, to the ninth. From these risers are taken branches on each floor to supply all fixtures. On the floor shown in the plan—the eighth—there is one 2-inch branch from each riser. On these branches, as near as convenient to the risers are placed stop cocks. Being under the hall floor, which is tiled, they are rendered accessible by brass deck-screws, set flush with the surface of the floor. The pipes under this tiled hall are in trenches or channels in the concrete under the tile. The division of the building on the left is supplied through one 1½-inch pipe running under the hall. From this main line branches—mostly ¾-inch—are taken to the rooms on either side to supply the side lights on that floor and the centre lights of the story below. The floors of the office rooms are of wood, and over all centre drops and branches are left pockets—two strips of the narrow floor boards about a foot long, fastened down by screws—to give easy access to the pipes at these points for repairs or alterations. The course of the pipes to each fixture is clearly shown on the plan and need not be further explained. The pipes under floors are supported in notches in the floor beams or cross boards between them. The branches to centre lights are ½-inch and to side lights ⅜-inch.

The right-hand division is supplied from two 1½-inch branches, one near the middle of the double row of rooms on each side of the hall, as shown. This plan shows, perhaps, the most common method of distribution from the floor mains, but where practicable, the vertical mains or risers are brought up nearer the centre of the area to be supplied, in order to equalize the pressure at opposite extremities. Of course every building must have a plan peculiar to itself for the gas fitting as well as everything else. In a long and narrow building the best plan might be to have a riser in the middle, with floor mains through a central hall, branching from the riser in opposite directions; while in a large building surrounding a court, the horizontal mains might run near the partition wall between the outside and inside rooms, all around the building, being fed from risers on two opposite sides.

Where meters are required for each office the system becomes more complicated, and as this practice has now passed out of use, as we understand, in the construction of new buildings in this city, we will not illustrate it. The result to be accomplished is the same, however, as in the other case—the most uniform distribution with the least pipe consistent with the plan of the building and the location of fixtures.

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AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.*

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

(Continued from page 416.)

The taper employed for the conical tube-ends is uniform with all makers of tubes or fittings—namely an inclination of 1 in 32 to the axis. Custom has established also a particular length of screwed end for each different diameter of tube. Tubes of the several diameters are kept in stock by manufacturers and merchants, and form the basis of a regular trade in the apparatus for warming by steam. A knowledge of all these particulars is therefore essential for designing apparatus for the purpose. The ruling dimension in wrought-iron tube work is the external diameter of certain nominal sizes, which are designated roughly according to their internal diameter. These nominal sizes were mainly established in the English tube trade between 1820 and 1840, and certain pitches of screw-thread were then adopted for them, the coarseness of the pitch varying roughly with the diameter, but in an arbitrary way, utterly devoid of regularity. The length of the screwed portion on the tube end varies with the external diameter of the tube according to an arbitrary rule-of-thumb; whence results, for each size of tube, a certain minimum thickness of metal at the outer extremity of the tapering screwed tube-end. It is the determination of this minimum thickness of metal for the tapering screwed end of a wrought-iron tube which constitutes the question of mechanical interest.

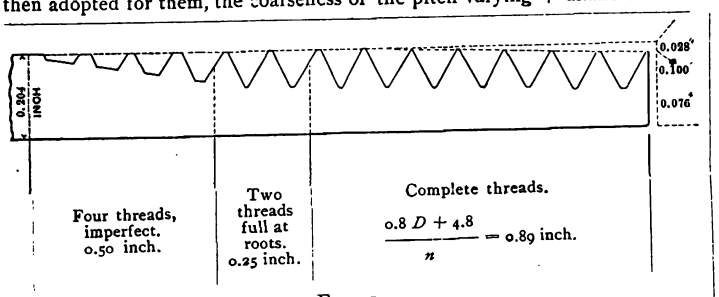


FIG. 1.
Thread of 2½ inch tube. Enlarged double full size.

A longitudinal section of the tapering tube-end, with the screw-thread as actually formed, is shown double full size in Fig. 1 for a nominal 2½-inch tube, that is, a tube about 2½ inches internal diameter, and 2⅞ inches actual external diameter.

The thread for pipes employed has an angle of 60°; it is slightly rounded off both at the top and at the bottom, so that the height or depth of the thread, instead of being exactly equal to the pitch, is only four-fifths of the pitch, or equal to $0.8 \times \frac{1}{n}$, if n be the number of threads per inch. For the length of tube-end throughout which the screw-thread continues perfect, the empirical formula used is $(0.8\,D + 4.8) \times \frac{1}{n}$, where D is the actual external diameter of the tube throughout its parallel length, and is expressed in inches. Further back, beyond the perfect threads, come two having the same taper at the bottom, but imperfect at the top. The remaining imperfect portion of the screw-thread, furthest back from the extremity of the tube, is not essential in any way to this system of joint; and its imperfection is simply incidental to the process of cutting the thread at a single operation. From the foregoing it follows that, at the very extremity of the tube, the diameter at the bottom of the thread $= D - \left[\frac{2 \times (0.8\,D + 4.8)}{32\,n} + \frac{2 \times 0.8}{n}\right] = D - (0.05\,D + 1.9) \times \frac{1}{n}$. The thickness of iron below the bottom of the thread, at the tube extremity, is empirically taken to be $= 0.0175\,D + 0.025$. Hence the actual internal diameter d of any tube is found to be, in inches,

$$d = D - (0.05\,D + 1.9) \times \frac{1}{n} - 2 \times (0.0175\,D + 0.025)$$

$$\text{or } d = 0.965\,D - 0.05\,\frac{D}{n} - \frac{1.9}{n} - 0.05.$$

For the various sizes of tubes, ranging from ⅛ inch to 10 inches nominal internal diameter, with their corresponding numbers of screw-threads per inch, the actual internal diameter d is expressed by the following Table I. in terms of the actual external diameter D.

TABLE I.

Diameters of Wrought-Iron Welded Tubes for Warming by Steam.

Nominal Internal Diameter of Tube.	Number of Screw-Threads per inch.	Actual Internal Diameter d in terms of actual external diameter D.
Inches	No.	Inches.
⅛	27	$d = 0.9631\,D - 0.1204$
¼ and ⅜	18	$d = 0.9622\,D - 0.1556$
½ and ¾	14	$d = 0.9614\,D - 0.1857$
1 1¼ 1½ and 2	11½	$d = 0.9607\,D - 0.2152$
2½ to 10	8	$d = 0.9587\,D - 0.2875$

The number of screw-threads per inch for the several sizes of tubes is here accepted from customary usage. It is the workman's approximation to the pitch practically desirable, and much reluctance must consequently be felt in calling it in question. Still it would have been better to investigate the general case upon the basis of a pitch ranging in closer accordance with the range of tube diameter. Thus, the nominal ½-inch tubes might have had 16 threads per inch; ¾-inch, 14 threads; 1 and 1¼-inch, 12 threads; 1½ and 2 inches, 11 threads; 2½ to 3½ inches, 10 threads; 4 to 6 inches, 8 threads; 7 to 9 inches, 7 threads; and 10 inches, not more than 6 threads per inch The existing numbers of threads however, are now too well established to be disturbed: at all events they must be taken in any statement of present practice.

The smaller sizes of tubes, up to and including 1¼ inch nominal inside diameter, are butt-welded, and are proved by hydraulic pressure to 300 lbs. per square inch. The larger sizes, commencing with 1½ inch, are lap-welded, and are proved to 500 lbs. per square inch by hydraulic pressure. The question of butt-welding or lap-welding is simply one of economy in manufacture: it is not easy to make lap-welded tubes of less than 1½ inch inside diameter, while it is cheaper to make lap-welded than butt-welded tubes of that size and upwards. The proving pressures here given are far below the ultimate strength of sound welded tubes; and when required the test is increased to double or treble these pressures.

[TO BE CONTINUED.]

* A paper read before the Institution of Civil Engineers, November 28, 1882.

A JOB WHICH CAUSED A NUISANCE.

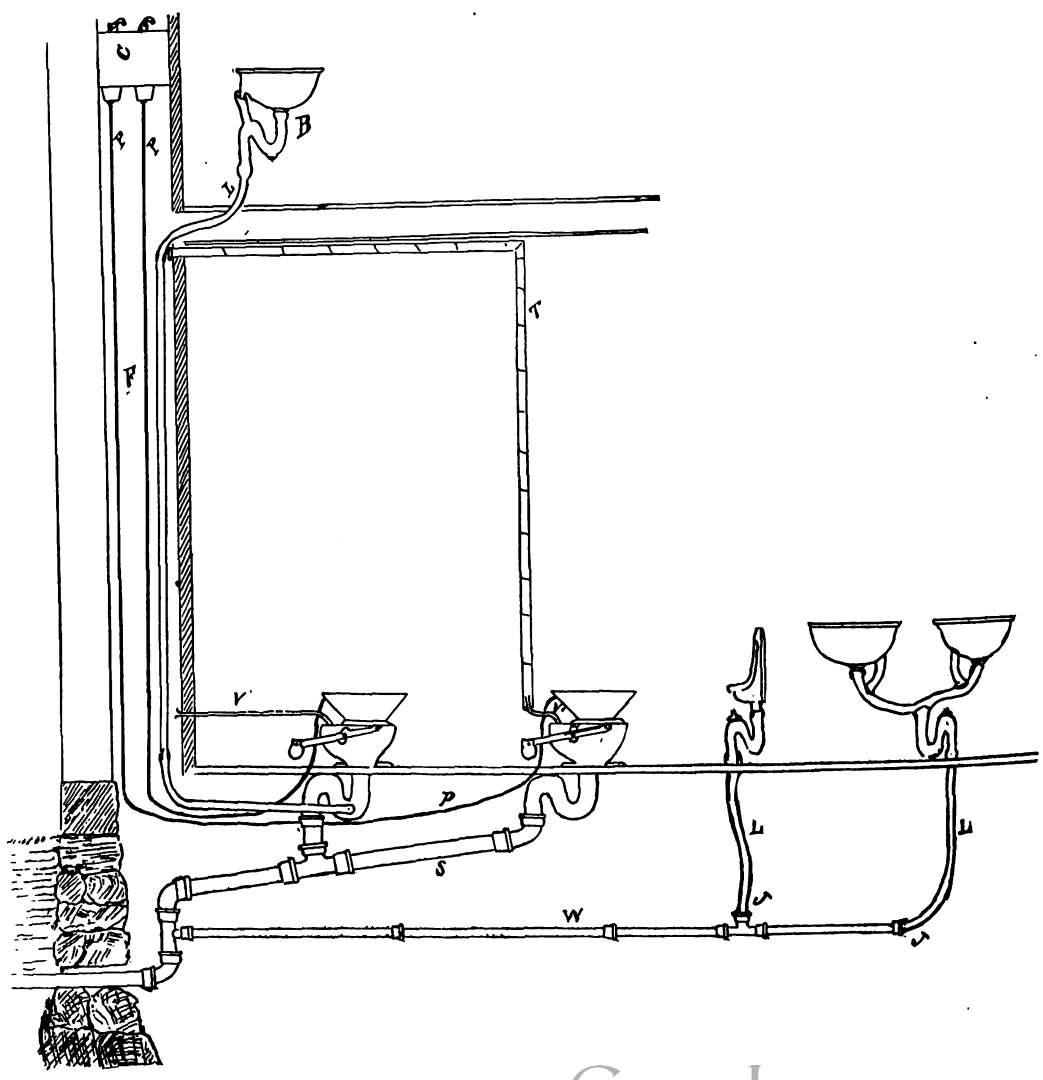
NEWBURYPORT, *March* 12, 1883.

To the Editor of THE SANITARY ENGINEER:

I send you sketch of a job representative of the work usually done in this place. The worst feature about it is that it has been done within two years under the supervision of our best (?) architect. This work is in our public reading room attached to our public library. The reading room was a gift—or rather the money that built it, to our city, and the idea of the donor and trustees having the matter in charge was to have everything as good as money could buy.

How well they succeeded as regards the sanitary arrangements, the following description of sketch will show. *F* is a space running from cellar to attic, between outside brick wall and lath and plaster partition. *T* is a 3-inch tin pipe running from near the receiver of pan closet to inside of space, which is utilized as a sort of ventilating shaft by the architect. Into the bottom of this tin pipe a lead pipe, *V*, is run from receiver, as shown, the space between the lead pipe, which is ¾-inch, and the 3-inch tin pipe being left open. *V* is lead pipe from other receiver direct to this space. *P P* are ¾-inch lead pipes from a cistern, *C*, at least 30 feet from closets, as the pipes run, and they are run far from direct, and in the crooked "hanging" manner, as shown. The service boxes are very small and the valve inside but 1¼ inches, consequently the flush is a mere trickle of a quart of water. The waste pipe *L* from basin *B* is 1¼-inch, with trap connected exactly as shown; *W* is cast iron 2-inch pipe, and *L L* 1¼-inch lead from urinal and basins with putty joints at *J J*. The soil-pipe *S* runs direct to a cesspool a few feet from cellar wall, without trap, air-vent or ventilation of any kind, the cesspool being covered over with turf. The cesspool is of the loose, no bottom, open-sided kind, built to have liquids soak away as fast as possible. The joints in soil pipe are supposed to be lead, but they are so covered with putty as to make it doubtful; but lead or putty, they nearly all, if not all, leak.

To my personal knowledge there has been a terrible stench in the building from the time this work was a month old, but no one seemed to notice it, till last week the pipe at cellar wall either froze or got stopped, and the result was the cellar bottom covered with filth, the water oozing



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and streaming from nearly all the joints. Now, the building is heated by steam indirectly by coils of 1-inch pipe, running all around on the outside cellar walls directly under the floor. These coils are enclosed in a tin-lined box, perforated on the bottom, so as to take the air from the cellar. The boilers, coal pen, and ash pen are all in this one open cellar.

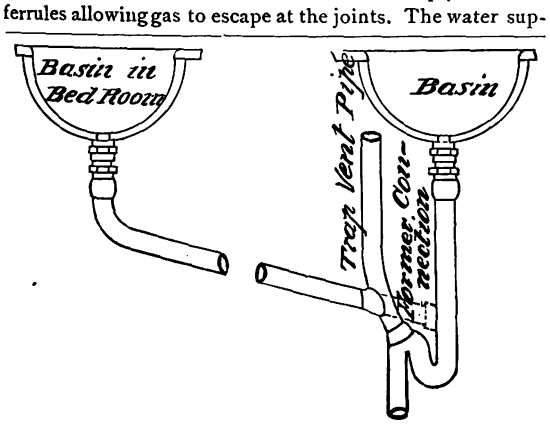
The air from the shaft *F* is diffused through the whole building between floors, in partitions, and into the library building itself. I find it is impossible to awaken any interest iu sanitary matters here, even our Board of Health being loth to do anything because public opinion is against them. If of any interest to you, I will send you sketch of the work in our City Hall, done last year at considerable expense. Some parts of it are even worse than at the library. Have you any subscribers to your paper in the city besides myself? I ask for the reason I wish to know who has *any interest* in sanitary matters. Nature has endowed our city with advantages above any place I ever saw, and yet our death rate is between 22 and 23 and our population 15,000. Our people are mostly native; very few foreigners. We have no sewerage and depend on loose cesspools and privies, and until this year no water supply other than wells sunk alongside these same cesspools.

Pardon me for intruding so much on your time, but the interest I feel in this matter has induced me to write more than I intended at first. "S."

[We have no means of knowing how many readers we have in Newburyport, since newsdealers furnish the paper to a considerable extent in the Eastern and Middle States. From our correpondent's description of the condition of affairs in that place, we should assume that THE SANITARY ENGINEER was not much read there. We shall be glad to receive the sketch referred to.]

VENTILATION OF THE PUBLIC SEWER INTO A BEDROOM.

The following case of dangerous plumbing recently came to the notice of the Health Department of this city, in this way. The occupant of a fine house on Fifty-eighth street, near Fifth avenue, after much unaccountable sickness in his family, requested the Board of Health to make an examination of the plumbing. These are some of the defects the inspector found. The earthenware house drain under the cellar floor had defective, leaking joints, allowing sewer gas to escape through the house, since there was no trap on it. The water closets on the second and third stories were connected to the soil pipe without ferrules allowing gas to escape at the joints. The water sup-



ply for the upper floors was insufficient. The sheet lead safe waste pipes connected into the waste pipes of fixtures on each floor. A basin in a bedroom had direct communication with the street sewer, (there being, as before stated, no trap on the main drain,) by being connected into the vent from the crown of the trap under another basin, and having no trap on its own waste pipe, as shown in the accompanying sketch. The connection of the basin having the trapless waste pipe, had originally been made into the waste pipe of the other basin above the trap (as shown by dotted lines), but when the plumbing was overhauled a year or two ago, a ventilating pipe was attached to the trap, and the other basin waste connected to it as shown.

Correspondence.

PLUMBERS' PROFITS.

PHILADELPHIA, PA., *April* 7, 1883.

To the Editor of THE SANITARY ENGINEER:

In response to your request for the views of your readers on "plumbers' profits," I would say that the profits of a plumber's business depend entirely on himself, and just here is the secret of the whole matter.

There are two classes of plumbers; one class respect themselves and consequently have the respect of their customers and the community generally. This respect is secured by being perfectly reliable and honest to the core, not by saying, you give a dollar's worth of material and labor, accepting a dollar or less in return.

My advice is, provide the best material in the market, arrange the work and construct it in an intelligent and workmanlike manner, and see that your workmen carry out the design to the letter. The man who conducts the plumbing business on this line will do good work and get fair profits. I grant he may not do as large a business, but what he does will be good, and generally he will get his price, for, after all, most of the people are willing to pay for work which they know is honestly done. I would rather be known as a high-priced plumber, doing good work, than as a cheap one and a miserable botch.

The other class of plumbers is what should be termed by every honest man, *a scab*—who will take one hundred dollars' worth of work for sixty dollars, and then take off ten or fifteen per cent. for cash, prostituting the business, botching everything they touch, simply because they have nothing at stake but to get the money. This is a brief description of the second class.

There is in every city a certain amount of work to be done every year. My advice is, do it well, demand your price, making it a fair one, and let the material men and bonus builders alone; they will injure themselves more than you if they do the wrong thing. Let the plumbers be fair to themselves and the profit will be satisfactory.

Yours respectfully,

1721 Chestnut St. JNO. WORTHINGTON.

BOSTON, *April* 9, 1883,

To the Editor of THE SANITARY ENGINEER.

I have been very much interested in Mr. Moody's letter, on the above subject, which I find in your last issue.

It is pleasing to consider that a change, such as my Worcester friend speaks of, is growing in the hearts of the people in his city.

I do not deny the progress that is going on here in the same direction, but I must confess it is rather slow, and we may all grow gray before it is perceptible. To use Mr. Moody's words, it is very unsatisfactory all around.

I am not one of those who are disposed to attribute all the blame to the dealers in our material; we are as much at fault as they.

I hold only one thing against the dealer, and perhaps I may not be correct in that. That is, as I am credibly informed, he allows a certain class of hangers on about his place, and ships them regularly as you would merchandise, to fit up the material sold directly to the purchaser, who labors under the impression that he has made a big thing in his bargain.

Now all I have to say in this connection is, that the consumer not only gets inferior labor—men who cannot obtain work in any shop, and have to hang around the dealers back door, to curry favor with the porter, but it costs him fully fifteen per cent. more, admitting that he purchased the goods for less money than he could obtain them by calling on the plumber.

Very Respectfully, J. T.

FLUSHING URINALS.

To the Editor of THE SANITARY ENGINEER:

Are urinals ever fitted with automatic flushing arrangement similar to that used with water closets, either by valve or cistern supply? Are cisterns anywhere generally used for flushing urinals? Is there any objection to flushing them direct from the general supply pipes?

D. C. B.

[We know of no valve supply to urinals that is automatic. Flush tanks both of the syphon and tilting type are frequently used. In England the supply is always from a cistern. We consider a direct supply objectionable, though the risks involved depend very much on circumstances, which vary greatly. The question is one on which a great deal can be said, and to which we shall probably revert at another time.]

LEAD BURNING.

ST. PAUL, MIN., *March* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

I have some small boxes, 2-feet square, to line with sheet lead, for chemical purposes. They want the seams "burnt" instead of being soldered. I never did any sheet lead burning and would be very happy to get a few instructions from you or some of your readers who understand it.

Is there any way to do it without a lead burning apparatus? What do they cost, and where can they be purchased? Is there anything used on a seam which is being burnt that takes the place of rosin or grease on a seam being soldered?

By answering the above you will greatly oblige a constant reader. Yours respectfully,

J. J. HUDNER.

[We would refer our correspondent to Mr. Thomas Walker, Kansas City, Mo., who has a machine for this purpose, with which, we believe, is furnished full instructions for lead burning. We described Mr. Walker's apparatus in our last issue.

CHICAGO PLUMBERS' SUGGESTIONS.

[From our Special Correspondent.]

CHICAGO, *April* 5, 1883.

The Master Plumbers' Association met this evening, President Daniel J. Rock in the chair and Alex. Murray Secretary, with some thirty other members present.

The following committees were appointed to arrange for the annual entertainment, April 20, embracing literary features, a banquet and a ball:

Reception Committee, Messrs. McGinley, Oliphant, Alles, Powers, Boy.

Floor Committee, Messrs. Ross, Enright, Teppel, Conlin, Reilly, Sims, Wade, Hickey, Ruh, Griffith, Gay, Roche.

Committee on invitations, The President and Secretary, with Aldermen Ryan and Sanders and Messrs. Gilmore, A. Young, Whiteford, Hamlin.

A very pretty badge was adopted, representing Hygeia in the midst of sanitary devices and surroundings worthy of the young and buxom Goddess of Health.

The Chairman of the Sanitary Committee, Andrew Young, presented the following, and it was adopted:

"The Sanitary Committee would call the attention of the Association to much of the so-called ventilation of soil pipes in old houses, the material used, extending up through the roof, being entirely unfit for the purpose, tin and iron pipe being used on account of their cheapness, and the iron work done by men who have no knowledge of the end in view. With such make-shift ventilation the remedy will be found in substituting first-class material, as the tin and galvanized iron pipes will not last for any length of time. Pipes should, if possible, be vented of the same material as the pipe itself and of the same size."

The paper of the evening was an interesting one, the subject being "Plumbing" and the essayist, J. J. Wade. Some full extracts may equally benefit and entertain the readers of THE SANITARY ENGINEER, and especially the plumbing fraternity:

"Let us go back a quarter of a century; we find the men then engaged in this business were held in high esteem, and upon careful research and thought I have unraveled the problem why they escaped the jibes, the jeers, and the suspicions too often vouchsafed to their successors now-a-days. Laboring under many disadvantages, compared with us of to-day, being obliged to make their own lead material by hand, they were, through necessity, good mechanics. To become so they served a full term of apprenticeship, to serve which required practice, head-work, aptitude for the business and a zeal to master all the details of a calling chosen for a life-time. In one word, what they professed to do they were masters of.

"Gradually since that time abuses have crept into our craft, enhanced through the complications brought about by the advance of the march of civilization, making greater demands on our intellectuality and thoroughness, which as a body we have not supplied, till we have been looked upon by a large portion of the public as a necessary evil. The core of the trouble is the lack of thoroughness in men who have entered our craft, though totally unfit to carry on their business, lacking the practical knowledge in the first place, and ready to jump into another business the next year, if it holds out greater inducements. All this is the result of the *practical* disappearance of apprentices. Twenty-five years ago it was deemed absolutely necessary to serve an apprenticeship of five years to become a master plumber; to-day the only requisite required to become one is to have capital sufficient to open a shop and hire a few men in whose ability he places confidence. I consider it our most pressing duty to do all in our power to remedy this evil. To do this successfully we must elevate the standard of our profession. I call it a profession, as it requires more to-day than a good mechanic to become a master plumber. More is required of us than merely laying pipe according to specifications; more is required of us than simply to stop a leak in a pipe; the system of drainage and sewerage, unknown twenty-five years ago,

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has added complications which make a knowledge of ventilation compulsory, requiring intellect and study as much as does the study of medicine, and, at no far distant day, the plumber in our cities will enjoy the confidence of the public."

The speaker exploded successfully the too common idea that there was anything lowering in the plumber's work, and took off happily, and amidst laughter, the apprentice boy who threw up the sponge:

"The ridicule so generously lavished upon us has struck him through, and he falters in his determination to 'stick it out.' He leaves, and, turning up behind the counter in a dry goods store, parts his hair in the middle, wears good clothes all day, and soars to the startling salary of $15 a week. A good plumber must of necessity be a gentleman. The general health of the community is placed in our hands, and the community has a right to expect intelligent, trustworthy, and conscientious men to look after its sanitary condition.

"Chicago to-day is as free from sewer gas as any other large city in the Union. I believe, so far, we have met all the complications arising from our vast system of sewerage, which runs practically under a flat surface, the grading being limited. But let us not remain idle, still more is justly expected of us; let us stand united and aid each other with counsel and advice.

"This Association, which was formed about a year and a half ago, in point of membership is next in strength to that of New York. It is the third organization formed by Master Plumbers in this country, and it was formed for the same reasons that the Associations of Brooklyn, New York, Washington, Baltimore, and other cities owe their existence and welfare to—necessity, stern necessity, and nothing else. It is fresh in the minds of everyone present here when but a few years ago we should have looked upon the fraternizing of the Master Plumbers as the mixing of oil and water, when jealousy ran so strong that each plumber believed that the town was only large enough to hold him, and him alone."

The speaker depicted the pecuniary loss and other baneful results that followed, and continued:

"The forming of associations, forging a strong band of union, is to-day not confined to us in Chicago, nor to a few large cities in the Union, but bids fair now to invade every village and hamlet in this great country. For the short space of time this Association has been in existence it has done wonders. It has established unity, it has done away with existing abuses and wrongs, as you all know, and it has established the great principle of our trade, that we, the 'Master Plumbers,' demand protection in the plumbing trade. And this Association has demonstrated successfully that when we are united our just demands have to be complied with.

"The plumbers of the Northwest are looking to us for counsel, advice, and experience, as has been shown by the number of letters we are in receipt of. Our Association is the nucleus of a bond of union among them, and in a very short time I hope—if only we steer clear of the rock of dissension, clearly enough marked out on the chart—to see this entire country present a unity of the plumbers, when the abuses and wrongs which now exist will be known no more. And when, in the National Congress of the Master Plumbers of the United States, the delegates of this Association of Chicago give their counsel, it will command the attention of that body as due the most energetic and united body forming part of the great National Congress."

CONCRETE WATER-PIPES.

In a late number of the *Annales des Ponts et Chaussées*, a cheap method of making water-pipes of small diameter is described. The pipes were formed of concrete in the trench itself. The mould into which the concrete was stamped in was of sheet-iron, and had a length of about two yards. The several pipes were not specially joined to each other, the joints being simply set with mortar. The concrete consisted of three parts of slow-setting cement and three parts of river sand, mixed with five parts of limestone *débris*. The inner diameter of the pipes was 9 in.; their thickness, 3 in. The average fall is given at 1:500; the lowest speed of the current at 1 ft. 9 in. per second. To facilitate the cleaning of the pipes, manholes are constructed every 100 yards or so, the sides of which are also made of concrete. The trenches are about 5 ft. deep. The work was done by four men, who laid down nearly 200 ft. of pipes in a working day; the cost was about 3*s*. 9*d*. per yard run. It is claimed as an advantage for the new method that the pipes adhere closely to the inevitable inequalities of the trench, and thus lie firmly on the ground. The work was carried out by M. Thanneur for the water-mains of the town of Coulommiers. It may here also be mentioned that in the course of the Canal du Verdon, which supplies the town of Aix-en-Provence and the neighborhood with water, several mains were carried in a similiar manner. Bnt the concrete pipes which are submitted to great pressure have not proved effective. The method, consequently, is only suitable for pipes in which there is no pressure, or only a very trifling one.—*Builder.*

Gas and Electricity.

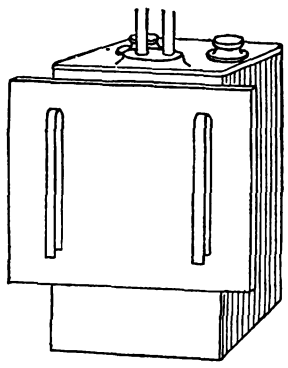
Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
April 7.....	26.76	20.39	22.15	29.60	29 32	19.67

E. G. LOVE, Ph.D., *Gas Examiner.*

SMALL SECONDARY BATTERIES.

Engineering describes the secondary batteries which were used to maintain the lamps on the heads of the piers in "Iolanthe," when performed at the Savoy Theatre. Each star consisted of a small incandescence lamp of two or three candle power, connected by flexible conductors to a secondary battery attached to the back of the wearer and concealed, either by a mass of hair or a pair of wings. One of these batteries is shown in the accompanying view, where it will be seen to consist of a gutta-percha box provided with two hooks for its attachment, and a board to prevent it soiling the dress of the wearer. The interior of



the box is divided into two cells, in each of which are two lead plates "formed" by alternate charging into a Planté battery. The positive plate of one cell is joined to the negative of the next, while the remaining pair of terminals are brought out for the attachment of the conductors from the lamp. In charging the stoppers are withdrawn to allow the gases to escape, and all the batteries coupled up in series, after which a current of two or three ampères is sent through them for one hour. When fully charged each battery, which weighs about four pounds, is capable of maintaining a lamp for about an hour.

REPORT ON FOOD ADULTERATION AND ILLUMINATING OILS.

The following is the report of the Sanitary Committee of the State Board of Health for 1882. It includes the results obtained in the enforcement of the Food and Drug Adulteration law, and also those under the law for regulating the sale of illuminating oils.

I. ILLUMINATING OILS.

On June 6 an act was passed by the Legislature regulating the standard of illuminatidg oils.

(This law has been already reprinted in THE SANITARY ENGINEER, Vol. VI. p. 52.)

This subject having been under discussion ever since the Board was organized, and a careful investigation having been made, under the supervision of this committee, of all the most important oil testers used in this country and in Europe, by Arthur H. Elliott, Ph. D., the results of which were published in the annual report for 1881, the Board was able soon after the passage of the act to adopt, in accordance with Section 3 thereof, the instruments and methods employed in this State for testing oils.

(A description of the apparatus adopted, together with the resolutions relating to its use, have been given in our columns and we omit their repetition here.)

These resolutions, together with the law, were printed and freely distributed throughout the State. The public analysts were supplied with the new tester, and carefully verified thermometer; and manufacturers and dealers were instructed in regard to the test.

Nine kerosene accidents have been investigated by Mr. Albert L. Colby, Inspector, four resulting in loss of life, and several others in great suffering to the victim, and in considerable loss of property. Four occurred in New York city, two in Brooklyn, one in West New Brighton, on Staten Island, one at Batavia, and one at Herkimer. Besides these cases, three others of alleged accident were investigated, which proved to have been due to other causes. The details of these investigations are presented as an appendix to this report. Nine other accidents came to the knowledge of the Sanitary Committee, which it was not possible to investigate, for various reasons.

The flashing point of the oils which gave rise to these accidents varied from 80° to 97° Fahr., a very significant fact, which proves conclusively that the standard 100° Fahr. adopted by this Board is not too high, as some have suggested.

As to throwing additional light on the proper standard of temperature to be fixed in determining the safety of these inflammable oils, I take the liberty of presenting the results of investigations made some time since to ascertain the temperature actually reached by oil in lamps under different conditions. Twenty-five lamps of different patterns were selected. They were all filled with the same oil, and were allowed to burn for several hours; from time to time the temperature of the oil in the lamps was carefully determined. These experiments were repeated on different days, to ascertain the effect of the atmospheric temperature.

The results are given in the following tables:

(For want of space we give only a synopsis of the results obtained in each of the three series of experiments).

FIRST SERIES.

	23 *Lamps.*	11 *Metal Lamps.*	12 *Glass Lamps.*
Highest temperature reached....	120° F.	100° F.	86° F.
Lowest temperature reached...	76	76	76
Average temperature.....	83	86	81

SECOND SERIES.

	25 *Lamps.*	12 *Glass Lamps.*	13 *Metal Lamps.*
Highest temperature reached...	120° F.	91° F.	120° F.
Lowest temperature reached.....	82	84	82
Average temperature	91⅙	86	96⅙

THIRD SERIES.

	25 *Lamps.*	13 *Metal Lamps.*	12 *Glass Lamps.*
Highest temperature reached....	129° F.	129° F.	98° F.
Lowest temperature reached.....	84	84	85
Average temperature	98¾	104½	92⅓

In the first series of experiments the temperature of the room varied from 73° to 74° F.; in the second from 82° to 84° F.; and in the third from 90° to 92° F.

Since September 1, when the work was organized, 236 samples of oil have been procured, in different parts of the State, and subjected to examination by the public analysts. Of these, twenty-two samples flashed, or emitted combustible vapor, at the ordinary temperature of the laboratory, before heat was applied, that is between 73° and 75° F. Thirty-three samples only stood the test provided by law. Of these thirty-three six flashed at scarcely 100°, two at 101°, twelve at 102°, one at 103°, five at 104°, three at 106°, one at 107°, one at 108°, one at 109°, and one at 110°. Two hundred and two samples out of the 236 purchased failed to stand the State test, one sample was too small in quantity to be tested. The table below exhibits in detail the results of the tests.

The Committee further report that Mr. J. M. Partridge, Fire Commissioner of Brooklyn, has adopted the instrument of the State Board, and will prosecute offenders in future. The law is now uniform for all parts of the State excepting New York city, where the charter of the city directs the Fire Commissioners to fix the instruments which shall be used in testing oils.

At the meeting of this Board, held in November, when this matter was under discussion, the following resolution was adopted, and subsequently sent by the Secretary to the Fire Commissioners of New York:

WHEREAS, According to the provisions of Chapter 292 of 1882, the standard safety test for kerosene oil throughout

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v York, with the exception or New York
:ed by the adoption of an instrument by
of Health, which establishes a standard of
which may be legally sold, similar to that
Ohio, Indiana, Illinois, Michigan, Iowa,
:nnessee, and
ccording to law, it is in the power of the
ners of the city of New York to adopt the
oved by the State Board of Health, as has
ne by the Fire Commissioner of Brooklyn,
complete uniformity throughout the entire
al standard of kerosene oil, therefore
at the Fire Commissioners of New York
illy requested to take this matter into con-
a view to the adoption of the State Board's

sent no response has been received from
ssioners of New York. The Fire Depart-
has offered to coöperate with the officers
this matter, and will in future secure sam-
xamination by the public analysts, when-
ccur.

ion has been paid to the accuracy of the
with the tester adopted by this Board, and
d that where the instrument is used by per-
xperienced in its use, and with a strict ad-
irections which were adopted by the Board,
ts circular, the tests rarely differ more than
provided the thermometers used are accu-

made to bring to trial the seller of the oil
e fatal accident at Batavia; but on bring-
before the Justice of the Peace, and pre-
s of the case, he decided not to hold the de-
now proposed to take the matter before the
d endeavor to secure the indictment from

TS OF 236 SAMPLES OF KEROSENE OIL TESTED IN 1882.

nperature			144
°–75° F.,		Oils flashing at 90° F.	5
	22	" " 91	11
F.	1	" " 92	10
	4	" " 93	6
	1	" " 94	5
	1	" " 95	7
	none	" " 96	3
	7	" " 97	5
	2	" " 98	2
	3	" " 99	4
	1	" " 100	6
	16	" " 101	2
	10	" " 102	12
	12	" " 103	1
	4	" " 104	5
	8	" " 105	none
	7	" " 106	3
	13	" " 107	1
	3	" " 108	1
	8	" " 109	1
	5	" " 110	1
	16		
	144	Total tested	235

s which stood the test 33
s below the test 202
mple insufficient 1
..... 236

es were purchased in eleven different cities
ne State. The accompanying table exhibits
f the samples purchased in each town.

OF KEROSENE OIL TESTED IN 1882.

	Samples collected.	Shops from wh'h the oil was collected.	Which stood the test.	Below standard.
.....	147	115	5	142
.....	10	9	1	* 8
Staten				
.....	2	2	1	1
.....	26	26	18	8
.....	3	2	0	3
.....	6	6	1	5
.....	10	10	0	10
.....	8	1	3	5
.....	1	1	0	1
.....	17	11	0	17
.....	6	6	4	2
.....	236	189	33	202

ot tested; sample insufficient.

ng table shows how the samples were dis-
g the analysts:

ILS TESTED BY EACH ANALYST FROM AU-
JST 17 TO DECEMBER 31, 1882.

Love, Analyst of "Southern" District.... 93
Hoffman, Analyst of "Southern" District, 78
Tucker, Analyst of "N. E." or "Cen-
District..... 52
Lattimore, Analyst of Western District... 26
249
repetition on same sample 13
l number of samples tested..... 236

[To be Continued.]

ELECTRIC LIGHT NOTES.

The posts for electric lamps on the East River bridge are being erected.

The Fulton street station, of the New York Elevated Railroad, is now lighted from the Edison Central Station, each former gas jet being replaced by a 16 candle power, incandesent lamp.

The Hartford Electric Light Company, elected officers last week, and decided on the arrangement of their installation. They have adopted the system of the American Electric and Illuminating Company.

A senate joint resolution passed last week, changing the name of the American Electric Company, of New Britian, Ct, to the Thomas Houston Electric Company, gives the corporation the right to increase the stock $1,000,000, divided as at present into shares of $25 each.

London *Times*; describing the electrical exhibition at the Westminister Aquarium, mentions a lamp, said to be 100,000 candle power, over the organ in the main body of the exhibition building, driven by an Elphinstone-Vincent dynamo. Another of these dynamos supplies 350 swan lamps, 20 candle power each in the smoking gallery. In the dining annex are 440 Swan lamps supplied by a Thomson-Ferranti machine. The lamps are divided into four series of 110 lamps each. In this same annex is a Dowson's economic gas producer supplying gas to an Otto gas engine 3½ horse power, which drives a Siemens' dynamo.

President White of Cornell University, states in a circular recently issued, that at the begining of the next academic year, (Sept. 18, 1883), students will be received in a course in electrical engineering. The general studies of the course, are mainly those of the departments of civil and mechanical engineering. The special studies embrace the theory of electricity, the construction and testing of telegraph lines, cables and instruments, and of dynamo machines, and the methods of electrical measurement, electrical lighting, and the electrical transmission of power.

The City Council of Nashville, Tenn, have received propositions from both the Nashville Gas Company and from the Brush Electric Light Company for lighting the streets. The latter offer to maintain 50 lights of 2,000 candle power each, every night in the year, for four years, at 65 cents a night per lamp, or 200 lamps of equal candle power for ten years at 60 cents per lamp a night. The company claim that the 200 lamps will give 50 times the amount of light given at present by gas. The Gas Company submitted four propositions, ranging from 3 cents per lamp a night for four-foot burners burning seven hours a night, to 6⅓ cents per lamp a night for six-foot burners 10 hours a night, the totals ranging from $7,938 per annum to $17,190, if the city has charge of lighting, cleaning and repairing, or $22,190, if these are left to the Gas Company. The number of gas lamps is between 700 and 800, and the local paper averages the propositions at $16,900 for the gas company, and $43,200 for the electric light company, giving 20 times as much light.

Meter-ites.

Mr. Chamberlain, of the English Board of Trade, states that the Board will soon undertake extended experiments on the relative powers of gas, oil and electricity as illuminants for lighthouses.

The bill regulating the price of gas, and providing for inspection of meters in New York and Brooklyn, reached a third reading in the Assembly last week. It provides that the maximum price for gas shall be $1.50 per 1,000 cubic feet of 6 candle power.

Another so-called explosion of sewer gas in a sewer is reported, this time from Baltimore, where it seems a boy threw a lighted match into a sewer, whereupon an explosion followed, which tore up the street and buried two boys in the débris. We may refer for the probable cause of such explosions to an editorial in our issue of February 22, 1883.

The annual meeting of the Montreal Gas Company last week brought out remarks by the President, Mr. Jesse Joseph, and others, which are of general interest to gas consumers and gas producers. The President, in answer to inquiries, stated that a reduction in price of 20 per cent. had been made, yet the consumption had increased during the twelve months $16,000. The demand for gas stoves was increasing. They had last year furnished 100 of them to customers, and expected to supply 200 the coming year. As to gas lost by condensation, the President thought it reached about 20 per cent. Another member thought the company would find it necessary to supply cheaper gas for heating, and that prices would have to fall to 75 cents for heating gas and $1 00 for illuminating gas. He thought the charge for meters should be abolished, and a large discount allowed to large consumers.

Health Commissioner Raymond, of Brooklyn, has received a communication from the Aldermanic Committee on Lamps and Gas, requesting him, in consequence of the alleged frequency of deaths from the inhalation of water gas, to cause to be made an analysis of the gas known by that name as manufactured by the Fulton Municipal Gas Company of Brooklyn, and also of the coal gas manufactured by the Brooklyn Gas Light Company, and to investigate to what extent the use of water gas is more dangerous to public health and life than is the use of coal gas; also to cause to be compiled a list of all deaths caused by the inhalation of illuminating water gas in the cities of Brooklyn and New York since its introduction in 1878, and a list of all deaths caused by inhalation of illuminating coal gas since its introduction in Brooklyn in 1849, and in New York city since 1878, together with the proportion of each gas used in these cities during that period. They also request the commissioner to inform them in what States of the Union the use of water gas, or any gas containing more than 10 per cent. of carbonic oxide, has been prohibited by law.

NORFOLK SEWERAGE.

Norfolk, Va., *March* 26, 1883.

To the Editor of The Sanitary Engineer:

The trial section of the Waring system of sewerage in our city has been completed and is now in running order. As yet no houses have been connected, the delay being occasioned by the committee in charge not having as yet decided upon an ordinance to regulate the plumbing. I send you a printed copy of the various ordinances submitted to this committee, in order that I may get your valuable judgment in regard to several conflicting laws between the first of the printed ordinances and the one submitted by my self.

I am nearly entirely indebted to your valuable publication, The Sanitary Engineer, for many of the laws submitted, and should I have been mistaken in any of my deductions, that publication would be the most acceptable source of correction.

In regard to difference of requirement between Section 2 of first ordinance, and Section 3 of mine, the decision can only be regulated by circumstances. In Memphis it was comparatively easy to force a people who had just emerged from the terrors of a devastating plague, to make connections with the sewers; but it is quite another thing to force hot-blooded Virginians, untutored as yet in sanitary science, to spend their scanty means to abolish that which they have not been taught to consider a danger or a nuisance. In the hands of fearless and efficient health commissioners, Section 3 of my ordinance would be sufficiently powerful to produce equally as effective results as would an irritating compulsory ordinance. It is simply needful to define strictly what the health officers shall consider a danger or a nuisance, and the law would give them the power to eradicate it.

I have hinted that our people as a mass are poor, and for that reason it is desirable that our ordinance should only make its regulations compulsory so far as the absolutely vital principles of house drainage are concerned. The most important of these principles are, that the appliance used should be, perfectly tight throughout, that is, practically impervious to gas and water; should have a continuous fall from head to outlet, and should be perfectly ventilated. Upon the first two of these principles these ordinances agree, but in the third we differ widely.

Section 7 of first ordinance demands that no trap or any manner of obstruction to the free flow of air through the whole course of the drain and soil pipes will be allowed, and the same shall be four inches in diameter from the public sewer to the top of the ventilating pipe.

I differ with them here, and insist that except in the case of out-houses, separated from the dwellings, a running trap and air inlet shall be provided between the house drain and the street, with a special ventilating pipe four inches in diameter throughout its length, of cast iron; the same to be placed on the side of the trap *next to the sewer*, and to extend above the roof.

The great characteristic of the Waring system in this city is the good grades on which the pipes are laid, and I have every faith in the quick removal of all dangerous substances from every part of the sewered sections, and believe that the system can be kept in perfect running order if

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properly managed; but the question now is, will the system always be properly managed? If so, I should assuredly recommend that the running trap be abolished; but until I feel that the governing officers of the work will not be appointed for political power, but solely in accordance with their qualifications as custodians of the public health, I would not advocate the abolition of traps on waste pipes What is your conviction in regard to this subject?

I am, yours very truly,

RICHARD LAMB,
Constructing Eng, Norfolk Sewers.

The following are the provisions in controversy:

AN ORDINANCE.

SECTION 1. It shall be a misdemeanor for any person to do, or cause to be done, any of the following acts, on territory which can be drained into the sewer, except as herein provided, and any and all such persons guilty thereof shall be fined not less than....dollars nor more than.... dollars for each offense.

SEC. 2. For the owner or occupant of any building of which any portion is used for any purpose during any part of day, to fail to have at least one water closet connected with the public sewer ...days after notification by the Board of Health, or their authorized agent, such water closet to be suitably arranged for a urinal, unless a separate urinal is provided.

SEC. 3. For the owner or occupant of any building in which food is cooked or clothing is washed, to fail to have a suitable sink, slop stone or hopper for the reception of waste water.

SEC. 4. To throw or allow to be thrown, or deposited on the surface of the ground, or in any hole or vault in or under the surface of the ground, any water which has been used for domestic purposes, or any liquid or solid filth, or fæces, or urine.

To allow any surface water or rain water from the ground or roofs of houses to enter any sewer or drain or any vessel or slop stone connected with any sewer or drain, or to admit any drainage water from any cellar to a sewer; provided, however, that drainage for cellars may be provided in accordance with the regulations and plans to be found in the City Engineer's office.

SEC. 5. To throw or cause to be thrown in any vessel or receptacle connected with a public sewer, any garbage, hair, ashes, fruit or vegetables, peelings, rags, cotton, cinders, or any other matter or thing whatsoever, except fæces, urine, the necessary closet paper and liquid house slops; or to use or cause to be used any house drain for any other purpose than those specified in this ordinance, except by special permission of the Board of Street, Sewer and Drain Commissioners.

SEC. 6. It is hereby made the duty of the Board of Health, through their Sanitary Inspector and the Police of the city, to enforce the foregoing provisions of this ordinance, and of the Board of Street, Sewer and Drain Commissioners, to supervise the plumbing and sewer connections, and to establish and promulgate such regulations for the same as they may, from time to time, deem proper.

Any person who shall neglect or refuse or comply with the requirements of such regulations, when promulgated, shall be liable to the penalties described in Section 1.

PLUMBING REGULATIONS.

SECTION 2. All soil pipes above ground shall be of iron, with lead or screwed joint, four inches in diameter, and shall be extended full size through the roof of the house.

SEC. 6. All iron soil and drain pipes shall be coated inside and out with coal tar, applied hot, and the four-inch cast iron pipe used shall weigh not less than 13 lbs. per lineal foot.

SEC. 7. No trap or any manner of obstruction to the free flow of air through the whole course of the drain and soil pipes will be allowed, and the same shall be four inches in diameter from the public sewer to the top of the ventilating pipe.

MR. LAMB'S ORDINANCE.

SECTION 1. Be it ordained, etc., the Board of Street, Sewer and Drain Commissioners shall have charge of the construction and keeping in order of all public sewers and drains.

SEC. 2. That their Engineer shall supervise the construction and repairs of all sewers and house drains, and shall keep a description with plans of the sewers, and an account of all expenses in his department.

SEC. 3. When the Board of Health shall deem any privy, cesspool or house drain to be a nuisance, or a danger to the health of the public or inmates of the house, they shall require the house to be drained and a connection with the public sewers to be made, in accordance with the rules and regulations of this ordinance; and in case of a neglect to do this within two weeks from the time of the receipt of the requisition of the Board of Health, the Board may instruct the Street, Sewer and Drain Commissioners to make such drains and connections at the owner's expense, the cost to be collected the same as city taxes.

Regulations for Planning House Drainage.

1. For each building there shall be a separate connection with the public sewers of four-inch salt-glazed vitrified pipes, which may extend from the curb, joining these with the public house connection pipes to within two feet of the house, the same to be jointed with oakum gasket and good cement, and from there the house drain shall be four-inch cast iron pipe, weighing not less than thirteen pounds per foot, with bells made sufficiently thick to make safely an air-tight wiped lead joint; or shall be made of four-inch wrought iron pipe, screw or wiped lead joint, coated with ashphalt to protect it from rust. This pipe shall extend upward as a soil pipe above the roof.

2. If the house drain runs under or through the house, a running trap and air inlet shall be provided between the house drain and the street, with a special ventilating pipe four inches in diameter throughout its length, of cast iron; the same to be placed on the side of the trap next to the sewer, and to extend above the roof.

Rules for Drain Laying.

5. In out-houses that are used for no other purpose than water closets, the running trap on the waste-pipe may be dispensed with, as well as the four-inch supplementary vent pipe. All fixtures, however, must be efficiently trapped, and each trap ventilated as directed in Sec. 4, Rule 3, of this ordinance.

[The points in these ordinances about which our views are asked seem to be questions that local considerations should control. We are not sufficiently acquainted with the situation to justify us in giving an opinion.

As to the regulations, it seems that Norfolk has selected a special system of sewerage in which certain details are claimed by its designer to be essential features. Without either condemning or endorsing all these details, we would venture the opinion that inasmuch as the portion of the work now built is a trial section, it would be only proper to carry out the system as directed by its designer in its entirety, and give it a trial. This will be only fair to the Engineer, and its strikes us as the most prudent course for the city. If any failure ensues the responsibility can then be placed where it belongs.

If other ventilation than that provided for is found to be necessary, then the question of pipes up the fronts of the houses, *versus* man-holes as ventilators, can be considered.

Since there are "hot bloods" and privy advocates, we imagine the local Board of Health will have a rough time of it if the discretion proposed in Mr. Lamb's ordinance is left to them, and they exercise it as contemplated by those who designed the sewerage system.

We notice the following omissions which it seems proper to call attention to: The first form fails to specify the department of the city government which shall maintain and repair the sewers; the second form omits any restriction as to what shall be allowed to enter the sewers. It also omits to give the Board of Health or the Sewer Commissioners authority to call on the police or any other executive body to enforce their orders. We would also suggest that iron pipe is not connected by "wiped" joints, as contemplated in Mr. Lamb's rules.

It seems to us that the drafting of an ordinance and plumbing rules for any city should be entrusted to persons who are familiar with local circumstances and conditions, and also with the best practice in places where sewers are not a novelty.]

CHECKING WASTE OF WATER.

LOUISVILLE WATER COMPANY,
549 3D ST., LOUISVILLE, KY., *March* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Our experience here co-ordinates with that of Cincinnati in a reduction of water consumption, yet we do not credit it to practical phonetics, as an article in your issue of March 22 implies that Cincinnati does.

Our consumption for the corresponding periods was as follows:

		JANUARY.	FEBRUARY.
In 1879	Gallons,	5,479,819	4,845,638
" 1880	"	5,526,542	5,658,991
" 1881	"	9,196,188	8,010,806
" 1882	"	9,186,992	8,519,438
" 1883	"	7,467,735	7,594,744

We attribute the reduction principally to the milder winter of 1882–3 as compared with that of 1881–2 or that of 1880–1. The jump in the daily rate of consumption from 5 to 9 million gallons between 1880 and 1881–2, we attempt to explain by saying that the latter two winters were the first severely cold winters, since we commenced supplying the city under an increase of 33 feet in the head, as compared with the head under which the supply was furnished in former years.

There is not very much difference in the methods of using water, both for domestic and manufacturing purposes, between Cincinnati and Louisville; and I attach little importance to any system of inspection which stops short of the introduction of meters, no matter how you embellish it with both art and science.

Very respectfully,

CHAS. HERMANY,
Chief Engr. and Supt.

[We understand that the water authorities of Cincinnati attributed the reduction in consumption during the past couple of years, to a system of inspection and the stoppage of leaks, said inspection being facilitated by the use of a waterphone. We think the article referred to leaves no room for any other inference. Mr. Hermany does not state whether or not he makes any effort to restrict waste. It would be interesting to have information on this point, also to know the average for the other months of the two previons years.

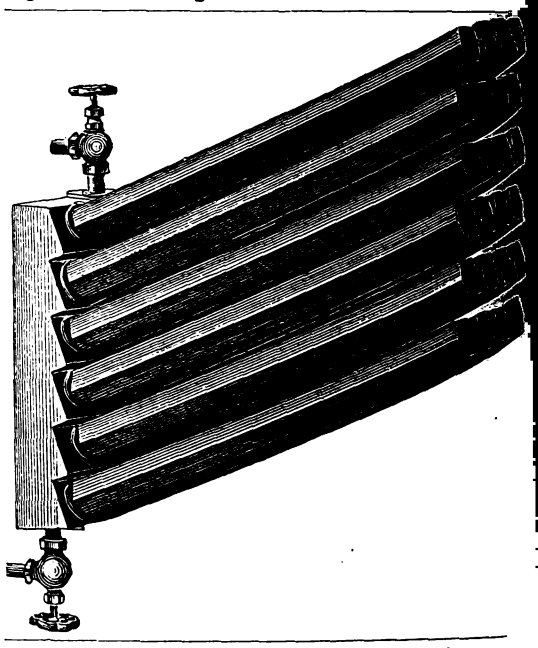
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

INDIRECT RADIATOR.

We illustrate here a novelty about to be put on the market by the A. A. Griffing Iron Company, of Jersey City, described as an "angle indirect radiator."

Figure 1 shows the heater in position, to be placed against walls; the inclination of the loops forming an angle of about 22 degrees to a horizontal line.



The loops are not set directly over each other, but staggered sufficiently so the flattened tube which forms one-half the loop, comes directly under the openings through the middle of the loop or under the space between them.

The free or outer ends of the loops form a parallel line with the wall, so that a square or rectangular coil casing may

be used without leaving a space at the ends of the loops.

In this style of heater, they are also going to use *extended surface*, one of the loops of which is shown in Figure 2, which can also be used in direct radiators if desired. The advantages sought by this arrangement being an increase of surface in the space ordinarily occupied by the Bundy radiator.

Construction Notes.

ALBANY.—The Senate Judiciary Committee have reported favorably the bill authorizing a company to construct an aqueduct from the Hudson river at Glens Falls, in Warren county, along the Hudson Valley to New York, to supply New York and cities on the way with water. Capital $50,000,000.

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DOVER, DEL.—The bill authorizing Wilmington to borow $180,000 for sewerage and water supply has been mended to permit only borrowing $60,000 for purchasing vater rights. The amended bill has passed the House nd been concurred in by the Senate.

SPENCER, MASS., has had surveys made for a system of sewerage, by Mr. Healy, of Worcester. The main sewer, 18-inch pipe, is estimated to cost $12,000; street sewers, nine-inch and twelve-inch, $44,000, total cost $56,000.

DULUTH, MINN., Town Council has passed an ordinance giving to Messrs. Gray & Co., of St. Louis, privilege of furnishing gas and water.

BUFFALO,—On account of E. W. Everson, one of the contractors for the intercepting sewer, refusing to execute contract for Section C, the commission have resolved that new proposals for construction of this section shall be asked for. Bids to be opened to-morrow. Everson's bid was $109,587.

BROOKLYN.—The following bids for laying the new Eastern District water main were opened at the office of the Commissioner of City Works on the 7th inst.:

J. P. Crawford	$35,126.36
B. F. Stevens	51,226.34
Thos. McCann	43,791.00
Jas. F. Gillen	44,287.03
M. J. Dady	49,749.66
Thos. Newman	45,489.90
D. H. Valentine	54,638.60
S. L. Keeney	36,710.80
Albert Daggett	45,115.75
Freel & McNamee	42,299.54

NEW YORK.—The following bids for lighting the street and parks of the city for the year ending April 30, 1884, were opened at the Dept. of Public Works on the 6th inst. No decision by the gas commission had been made at the time of our going to press:

New York Gaslight Company, for all the city south of Grand street, $17.50 for each lamp; Manhattan Gaslight Company, for all streets between Grand and 34th streets, $17.50 per lamp; Metropolitan Gaslight Company, for all streets between 34th and 79th sts, $17.50 per lamp; Mutual Gaslight Company, for the streets between 34th and 63d streets, and for the parks between Grand and 34th streets, $17.50 per lamp; Harlem Gaslight Company, for streets between 79th street and Harlem river, including High Bridge, $19.50 per lamp; Central Gaslight Company, for the twenty-third and twenty-fourth wards, $29 per lamp; Northern Gaslight Company, for twenty-fourth ward, $32 per lamp; Yonkers Gaslight Company, for that part of the 24th ward formerly constituting the town of Kingsbridge, $30 per lamp; The Brush Electric Illuminating Company, for Union and Madison Squares, and for streets between 14th and 59th streets, and Fourth and Eighth avenues, 70 cents per night for each lamp; United States Illuminating Company, for Battery Park, City Hall Park, Washington Square, Tompkins Square, the Battery and Broadway to 12th street, Washington Square and Fifth avenue to 13th street, South street from Whitehall to Catharine streets, and West street from the Battery to West 11th street, 70 cents per night for each lamp; Brush Electric Illuminating Company, for High Bridge and its approaches, $1 a night for each lamp; the bid of the Northern Gaslight Company was declared informal. The prices are the same as now paid.

NEW YORK.—The contract for the construction of a public school house on 68th street, in the 19th ward, has been awarded to Edward Morrison, for $120 000.

The contract for 2,000 feet of hose for the fire department was awarded to the Gutta-percha and Rubber Manufacturing Company of this city for $3,750, and for a new boiler for fire engine No. 12, to the Clapp & Jones M'f'g Co, of Hudson, N. Y., for $1,300.

PHILADELPHIA.—*Gas Trust Contracts.*—The Gas Trust have awarded contracts for supplies for the works from the bids opened on March 22, as follows:

For furnishing pig lead and pig tin, to Tatham Bros., at 4.69½ per cwt. for lead and 21¾ cts. per lb. for tin; for ead pipe, to N. & G. Taylor Co., at 6 cts. per lb.

For furnishing 500 street lamps, to Joseph Newman, at 3.65 per lamp.

BOSTON.—The annual report of the city Engineer, ows that the average daily consumption of water from e Sudbury and Cochituate Works was 31,970,800 gallns; from the Mystic Works, 6,574,400 gallons. The nsumption from the Sudbury and Cochituate Works ows an increase of about three per cent. over that of the year 1881, while that of the Mystic Works shows a decrease of about 85 per cent. About one half of this decrease was due to a reduction in the amount furnished from those works for the supply of East Boston. The total consumption shows an increase of 330,300 gallons per day, or about one per cent. over that of 1881. The daily average consumption per head of population has been 91 gallons from the Sudbury and Cochituate Works, 77 gallons from the Mystic Works, and 88 gallons from the combined supplies. From the high service works, the daily average was 2,786,545 gallons, an increase of 15.7 per cent. over that of 1881. The cost of construction of Basin 4, to January 1, 1883, including the cost of plant on hand, is $162,469.35. The cost of removal of loam, including cost of steam-excavator, and of grading 2,900 of track, is $10,963 92. The intercepting system of sewerage is at present in condition for use up to and including the point where the sewer is raised high enough to be discharged into the outer harbor, and that beyond this point it can probably be put into condition for use within a year. Extension and perfection of the system may continue for a year or two longer. The work, as a whole, and in its parts, is known to be durable and efficient, and no doubts are entertained that it will accomplish the good results which have been claimed for it. The total appropriation for improved sewerage is $5,253,000. The gross expenditure to January 1, 1883, including that for preliminary surveys, has been $3,389,104.07, leaving a balance of $1,863,895.93.

CHICAGO.—The contract for street cleaning was awarded, April 3, to Chas. Walsh & Son, at $34.90 a mile, the number of miles to be cleaned this year being 2,500. Walsh's bond is $120,000. John Garrick, a lower bidder, refused a contract.

The new Bridgeport lock was put in operation April 2, and canal navigation opened.

The Southington, Conn., Water Company is investigating the best sources and mode of supply for that town, with the aid of their engineer, Mr. T. H. McKenzie, and Mr. J. J. R. Croes as consulting engineer.

The New Orleans, La., Water Works Company has sued the city for damages for having granted permission to an ice company to convey river water to its premises some distance from the river. The water company claims that their contract with the city excludes all persons, except riparian occupants, from taking river water for private uses.

The city of Nashville, Tenn., has a chronic difficulty with its water works machinery. The first pumping engines, put in a few years ago, were only persuaded to work after a good deal of coaxing and some material alterations. During last summer proposals were invited for additional engines, and the contract was awarded. An unsuccessful bidder and his friends are now convinced that the selection of machinery was influenced by corrupt considerations, and a committee is investigating the subject. Nothing but vague rumors have been adduced so far to sustain the charge that one of the most successful and reputable civil engineers of the country, and one of the largest manufacturing companies in the United States had combined to debauch the officials of this Tenneesee town. The presumption is certainly against the probability of any such dirty work by gentlemen of heretofore unquestioned high character and of excellent reputation.

Preparations are making to extend still further east on Long Island the conduit which supplies water to Brooklyn. Mr. Robert Van Buren, the chief engineer, thinks that by going ten miles a sufficient supply can be intercepted to bring the total quantity of water furnished the city up to sixty million of gallons daily. The works proposed will require two years or more for their construction. By the time they are finished the capacity of the present works will be nearly equalled by the consumption and waste water.

GOVERNMENT WORK

Synopsis of bids, opened March 26, for marble and granite for Washington monument. Marble: H. Sisson, Baltimore, $1.50; Lee Marble Co., New York, $1.29. Granite: Gill & McMahon, Baltimore, 75 cts.; Cape Ann Granite Co., Boston, 56 cts.; Bodwell Granite Co., Rockland, Me., 65 cts.; William S. White, Rockland, Me., 51 cts.; Mt. Waldo Granite Works, Frankfort, 59 cts.; Henry S. Taft, Providence, R. I., 75 cts.

Synopsis of bids opened March 31, 1883, for encaustic floor tiling, for the Custom House and Post Office at St. Louis:

Henry Dibble	$14,300
	11,696
	10,696
	10,696
W. G. Flannery	20,350
T. Aspinwall & Son	16,500
U. S. Encaustic Tile Co	12,270
	11,370
	9,580

Synopsis of bids for iron fences, gates, etc., for approaches of Court House and Post Office at Danville, Va.:

Champion Iron Co	$790

Synopsis of bids for stone work, etc., and for granolithic sidewalks of Danville, Va., Court House, opened March 31, 1883. Granolithic pavement, stone works:

Robert Davitts	$3,975
H. L. Crawford	775

Synopsis of bids opened March 30, 1883, at the Navy Pay Office, Washington D. C., under the cognizance of the Bureau of Steam Engineering. For lumber:

	12,000 ft. W pine.	6,000 ft. B. walnut.	2,000 ft. W. ash.	5,000 ft. W. pine.	1,000 ft. Y. pine.	Total.
J. B. Cross, Jr	@ $57.50 per 1,000	@ $145.00	@ $45.00	@ $39.00	@ $14.50	$1,972.50
Willett & Libbey	668.00	740.00	100.00	200.00	16.00	1,859.50
Wheatley Bros		110.00	40.00	40.00	15.00	1,724.00
W. W. McCullough	@ 50.00 per 1,000	@	@	@		1,553.00
W. McLean & Son	882.00	925.00	135.00	250.00	25.00	2,217.00

List of proposals received by Geo. Meigs, for furnishing rope and lumber for the new Pension Building for scaffolding, opened at noon, April 3, 1883.

Names of Bidders.	½" tarred Hemp rope. Price per lb.	1½ inch Lumber. White Pine Price per M.	1½ inch Lumber. Yellow Pine Price per M.
L. H. Schneider & Son	10½c.		
G. G. Curtis per G. N. Rowe			$13.75
Wheatley Bros			17.50
McLean & Son	$10.87	$21.48	19.45*
W. W. McCullough		32.00	14.00† / 17.50
Wimsall & Uhher	10⅞c.		14.40
J. & J. E. Libbey		21.80	19.00‡ / 15.50
Thompson & Co	11c.		
Jos. H. Lee	$10.37		
Jos. L. Savage	10 9-10c.		
C. W. Johnson	10 ¾c.		
Windsor & Grayson		27.48	14.98‖
E. B. Wheeler	11¼c.		
Jas. H. McGill	$9.62		
J. B. Kendall	9.89		
Willett & Libbey		22.00	13.45
Thos. W. Smith		21.50	

*1¼ inch. †2 inch. ‡Cypress. ‖$1 add'l if more than one delivery.

All Washington bidders. Bid of Jas. H. McGill for rope, and bid of Willett & Libbey for yellow pine accepted.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

No. 51 Catharine st, br ten; cost $20,000; o, Bridget Kane; a, Balcock & McAvoy....186 Broome st, br st & ten; cost $10,000; o, Magdalena Brommer; a, Julius Boekell....371 Canal st. br and ir front st;

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cost $26,000; o, Olin G. Waldridge; a, S. A. Warner; b, A. C. Walbridge....496 & 498 West st, br ten; cost $5,000; o. C. Malone; a, A. Craig; b, not selected....83 South Fifth av, br factory and extensions 100; cost $12,000; o, B. M. Martin; a, Jas. E. Ware; b, not selected.. 9th av, s e cor 16th st, br warehouse; cost $100,000; o, R. Arnold and Henrietta Constable; a, W, Schickel; b, Marc Eidlitz....Broadway, n w cor 19th st, br and Belleville st building; cost $180,000; o, Robert & Ogden Goelet; a. E. H. Kendall; b, Sinclair & Wills and Steele & Costigan....389 av A, br stable and dwel; cost $5,000; o, John Dwyer; a, Julius Boekill ..166 W 28th st, br stable; cost $8,000; o, D. Lydig Suydam; a, H. E. Ficken; b, not selected... 335 W 53d st, br st and ten; cost $5,500; o, John Corkedale; a, Youngs & Campbell; b, not selected....Fifth av, e s, 100 n 59th st, br brown st and terra cotta st; cost $200,000; o, Park & Tilford; a, D. & J. Jardine; b, J. H. Rogers and A. G. Bogert & Bros.....Lexington av, s e cor 68th st, br grammar school; cost $100.000; o, Mayor, &c ; a, D. ·. Stagg ...69th st, n e, 195 w 3d av, br stable and dwel; cost $60,000; o, Adolph Kuttroff; a, W. Schickel....69th st, s s, 230 e 5th av, mansard br and Belleville st dwel; cost $75,000; o, Auguste Richard; a, W. Schickel; b, Richard Deeves....84th st, n s, 125 e 3d av, 3 br st ten; cost, ea $13,000; o, James Higgins; a, A. B. Ogden; b, John Keating.. 2d av, e s, about 23.8 s 86th st, two br and Dorchester st double flats and extension; cost, ea $28,000 o, Miss Julia Rhinelander; a, H. J. Hardenbergh; ....113th st, n s, 75 e Madison av, br church; cost $10,200; agent of church, E. L. Clark....71st st, s s, 80 w 9th av, five Connecticut br st dwel, and extensions; cost $100,000; o, George W. Hamilton; a Thom & Wilson....104th st, s s, 250 w 9th av, br dwel; cost $5,500; o, Mrs. C. A. Brown: a, George F. Babb & Walter Cook..111th st, n s, 121.11 w St. Nicholas av, 4 br dwel; cost ea $10,500; o, Edward J. King; a, D. & J. Jardine....10th av, w s, 25 s 130th st, br amherst st ten; and exten; cost $9,500; o, John Lally & Mary Whelan; a, James S. Wightman,

ALTERATIONS, NEW YORK CITY.

143d st, on line of st at point 300 e 10th av, renew decayed portions; cost $2,500; o, W. H. DeForest; a, Lamb & Rich; b, S. H. Brown.... 47 W. 53d st, basement and br exten; cost $5,c00; o, Charles H. Lowerre: a, James E. Ware....3d av & 2d av, 65th an 66th sts, Third av, R. R. depot, opening in 66th st side, iron girders, floor beams, &c.; cost $4,000; o, Third av, R. R. Co.; a, P. F. Schoen; b, J. & W. C. Spears; iron works, Z. S. Ayres....167 W 34th st, basement and one story br exten, tin roof, doors in rear &c.; cost $3,000; o, James R. Taylor; a, Rob't Taylor....448 W 14th st, 2 and 3 story br exten; cost, $2,500: o, Hugh King; b, Tallman & Baldwin....1227 and 1229 3d av, s e cor 71st st, enterior alt, new stairs, skylight, &c.; cost $5,000; o, Edith C. Iselin et al; a, H. J. Hardenbergh; b, not selected....1237 and 1239, front building and theatre, each raised one story, alt to theatre enterances, new stairways, &c.; cost estimated $40,000; o, Ed. F. James, a, J. B. McElfatrick & Son....80 E 2d st, add one story, part of a front wall supported by iron beams, &c.; cost $4,000; o, Emilia Sauer; a. F. Bernhardt... 27 W. 15th st, br ex also br wall on side of present ex, ir columns to support bay &c.; cost $5,000; o, Fred Baker; a, H. E. Ficken....525 W 23d st, add two stories; cost $3,200; o, and a, George Collins.. 215 W 36th st, br ex; cost $4,000; o, Thos. McGowan....153 to 171 E 110th st, inclusive, fronts altered, iron work; cost $4,000; o, Abraham Steers

BROOKLYN.

Greene av, n s, 55 e Tompkins av, 3 br st dwel; cost ea $8,000; o, and a, J. H. Townsend....Flushing av, s s, 175 w Throop av, fr st and ten; cost $5,600; o, Jos. Bertina; a, Geo. Hillenbrand....16th st, n s, 137 W 4th av, br school house: cost $32,000; o, Board of Education; a, J. W. Naughton; b, T. Kelly and Martin & Lee....Monroe st, s s, 200 w Tompkins av, 2 br dwel; cost ea $2,80 ; o, a, and b, Chas. Isbill.... Nostrand av, n e cor Madison st, br ten; cost $12,000; o, Thomas Ellison; a, C. B. Sheldon; m, S. Auer... Madison st, n s, 20 e Nostrand av two br ten; cost ea, $20,000; o, a. and b, same as last... Clinton av w s, 251 n Atlantic av, br 2t dwel: cost $18,000; o, and a, J. Doherty & Son....Clinton av, w s, 120 n Atlantic av, br st dwel; cost $12,000; o and a, J. Doherty & Son....Adams st, w s, 100 n York st, br stable, cost $6,300; o, H. Wischman; a, M. J. Morrill; b, J. J. Reynolds and Morris & Selover....Pacific st, n s, bet Grand and Washington av, br ten; cost $7,000; o, Peter Connelly; a, J. D. Reynolds; b, John and P. F. Burns.

ALTERATIONS, BROOKLYN.

Walcott st, n s, 200 w Van Brunt st, br ex; cost $15,000; o, Board of Education; a, J. B. Naughton....139 Montague st, mansard roof in front; br ext; cost $6,000; o, Edward Earle; a, Mercein Thomas....60 to 64 South 5th st add one-story to rear ext; also repair damage by fire to front bldg; cost $3,000; o, George Young; a Jas. Rodwell.

BALTIMORE, MD.—Little Sharpe st, br, bldg; o, and b, O. G. Sommers ...Chesapeake s w cor, Lancaster st, 11 br, bldg; o, G. R. Prestman ...German st, n s, br, bdg; o, and b, Wm. Rankin ....Fayette st, s w cor, Vincent alley, 2 br, bldg; o, W. Taylor ....Jasper st, w s, br, bldg; o, and b, F. H. Elan....Mardon alley, br, stable, o, Wm. Kyser. ..Parish alley, 8 bldg; o, and b, John Waters....Eutaw place, bldg; cost, $30,000; o, S. Frank a, Chs. L. Carson; b, H. Smith & Son....Montrose, s s, 8 bldg; o, and b, H. Smith... Chester w s, 2 br, bldg; o, and b, H. Smith.... Castle st, e s, 4 bldg; o, and b, H. Smith....Heneriette, s w Howard st, elevator o, B, & O. R. R. Co....Chase st, s s, br bldg; a, Fanny Cawepr;.. Torvens st, w cor, Cotton Church extensive o, Johns Memorial church....2 Fayette st, rear br bldg; o, Hy. Lindman....Bruce alley e s, 4 br bldg; o, and b, G. W. Harper....Vincent alley w s, 4 br bldg; o, and b, G. W. Harper ....Chester st, w s, br bldg; o, J. D. Ernsberger....Chester w s, br bldg; o, and b, Geo. T. Harting ...337 Williams st, e s., br bl; o, D. Elliott...German s w cor Howard, br bank. house; o, Commercial and Farmers Nat. Bank....Eutaw e s, br bldg; o, Jos. H. Reiman....Clay s s, br warehouse; o, W. F. Primrose....Half Moon alley, 2 br bldgs; o, L. M. Renolds ...Broadway e s, 2 br bldgs; o, J. Herbel..Fayette s w cor Washington, 2 br bldgs, o, W. Kumlehn....Fredrick ave s w cor Smallwood, br car stable; o, U. P. R. R. CO....Caroline w s, greenhouse; o, B. F. Leitch .. Harford ave, e s, 2 br bldgs; o, J. Devereux....Peach alley, br bldg: o, Wm. Schmidt ..Spring, n w cor Hammond alley; br bldg; o, Kerven & Tyler....Short, w s, br bldg; o, C. & C. Rauch .. Townsend, w s, br bldg, o, F. W. Knoch....Calhoun, w s, 6 br bldgs: o and b, J. M. Cone....Hamlet e s, 7 br bldgs; o and b, B. F. Smith....Orleans n s, br bldg; o and b, H. F. Miller ....Eutaw Place, e s, 2 br bldgs; o and b, G. A. Blake....Essex, n s, o and b, P. Flanary.

BOSTON, MASS —40 and 42 Tufts st, fr dwel and store, o, Mrs. Bridget McElroy; b, E. N. J. Tully....42 Prince st, fr dwel and store; o and b, same as last....Elm st, nr Ashley av, fr dwel, o and b, George B. Green....Elm st nr Ashley av, fr dwel; o, Neil Beeton; b, John C. Chapman....257 Marlborough st, br dwel, o, Wm. Simes; b, Woodbury and Leighton....113 Newbury st, br dwell, o, George R. Shaw; b. Norcross Bros .. Boston and Providence R. R. Yard, br store house; o, Boston and Providence R. R. Co; b, George F. Folsom....149 Newbury st, br family hotel; o, Joseph Goddard; b, James Fagan....30 and 42 Berkely st and Appleton sts, br Y. W. Christian Association Building; o, Boston Y. W. Christian Association; b, Augustus Lathrope....George st nr Hudson st, fr dwell; o, Chas. E. Titus; b, F. W. Webster.... 378 West First st, fr storage; o and b, George W. Bail. .Tremont st, opp Wigglesmouth, fr dwell; o, Michael J. Shay; b, McDonald & Tobin....520, 522 and 524 East 5th st, 2 fr dwel; o and b, Lyman Locke....Baldwin place, 2 fr dwel, o, B. F. Fiske and C. Marshall; b, Benj. Wood... 12 Faxon st, fr dwel; o, James Devine; b, Thos. Donahue....Private way from Washington st, nr Madison st, fr dwel; o, Chas. W. Price; b; Samuel W. Davenport....Houghton st, nr Houghton Ct, fr dwel; o, B. F. M. Stoddard; b, H. P Oakman....105 Smith st, fr dwel; o, James Haley; b, Samuel Rantin....Spring st, cor Baker st, fr hall and stores, o, Lucy M. Leighton; b, Lyman Locke....2 Dickens st, fr dwel and store; o, E. F. Pierce; b, W. H. Gordon....River st opp Temple st, fr dwel, o, Chas. Brown; b, F. M. Serrance.... Unnamed st, nr Clarence pl, fr dwel, o, Chas. Reuter; b, E. Shapligh.

CHICAGO, ILL.,—526 Van Buren st, br st and dwel, cost $10,000; o, Joe Raster; a, D. Adler & Co; b, not let. ..336 N Franklin, br flats, cost $7,500; o, Louis Broberg; a, Jno. Otter; b, Jno. Mountain 574–592 Congress st, br dwel, cost $25,000; o, Reynolds Estate; a, T. V. Wodskier....47 E Chicago av, br store and flats, cost $7,500; o, A. O. Lindblad; a, A. Andrets; b, Jno. Mountain.... 299–301 Michigan av, br barn, cost $7,000; o, E. J. Lehwean; a, none; b, not let....34 Le Wayne st, br dwel; cost $5,000; o, Eli Thou; a, none· b, not let...3841–3843 Wentworth av, br flats; cost $5,000; o, Gorman & Costello; a, done; b, not let. 171–173 Sedgwick st, br flats; cost $20,500; o, H. Rumsfeld; a, Jno. Otter; b, N. Wendt... 95–101 Fowler st, br dwel; cost $10,000; o, Fred Grimsel & H. Dresselhaus....1326–1330 W Lake st, cost $9,000; o, J. M. Allen....490 Belden av, $15,000; o, Anna Halsted; a, D. Adler & Co; c, Jno. Pedgrift....Illinois av nr 32d st, 19 br cottages; cost $19,000; o, S. E. Gross; a, none; b, owner....131 Michigan st; br store; cost $10,500; o, Chas. F. Grey; a, Treat & Toltz; b, not let... 1616 Prairie av, br dwel; cost $15,000; o, W. G. Hibbard; a, Treat & Toltz; b, A. Biewolt, et al.

CHICOPEE, MASS.—Frame house; cost, $6,000; o, N. Whittier; a, Richmond & Seabury; b, Mordy....Maple st, b and w dwel; cost, $50,000; o, W. Wessan; a, C. Luce; b, Boston parties... Federal st, br dwel; cost, $30,000; o, J. Wesson; a, E. C. Garener; b, Self. ....Harrison ave, br block; cost, $40,000; o, E. Morgan; a, E. C. Gardner; b, M. M. Goodell....State st, fr stable; cost, $5,000; o, E. Morgan; a, E. C. Gardner; b, M. M. Goodell....School st, fr dwel; cost, $7,000; o, F. G. Tobey; a, E. C. Gardner; b, Shattuck.. State st, br dwel; cost, $10,000; o, T. M. Walher; a, J. M. Cunnier .. Bowdoin st, fr dwel; cost, $12,000; o, H. Rude; a, M. Cunnier.

CINCINNATI, OHIO.—Cor 4th and Ludlow sts, br dwel; cost $15,000; o, Martin Bare; b, Chas. Crapsey....7th w of Freeman st, 4 br, cost $10,000; o, Extain White Lead Co; b, Wm. N. Stewart & Son ... Cor Freeman and Denman st, 8 br; cost $18,000; o, H. Werdmann; b, H. Werdmann.. Cor Main and Liberty st, 4 br, cost $9,000; o, H. Ange; b, G. H. Plump....Park av nr Knuper Lane, 2 br, cost $10,000; o, F. Dunkenheimer; b, Jos. Magley....Maine nr Liberty st, 4 br; cost $6,500; o, Wm. Stephens; b, H. W. Kopp ....214 Clark, 4 br, cost $5,700; o, F. Rolf; b, Anton Duren.

DENVER, COL.—15th st, stores, cost $10,000; o, F. R. Eastman; a, W. Littlefield....Hodgkiss st, br dwel; cost $6,000; o, Levi Wood; a, Uarian & Sterner ...North Denver st, br school house; cost $15,000; a, Wm. Quayle.

EVANSTON, ILL.—Fr dwel, cost some $13,000; o, Geo. Lord; a, Burnham & Root; b, not let....Five fr dwel, cost some $30,000; o, Z. Holbrook; a, Burnham & Root; b, not let.

JANESVILLE, WIS.—Br dwell; cost $10,000; o, C. W. Hodson; a, Dixon & Townsend; b, not let.

KANSAS CITY, KANSAS.—Troost av, n w cor 8th st, brick; cost $5,500; o, John Spengler.

LAKE VIEW, ILL.—Br and st dwel, cost $9,000; o, C. F. Webber; a, Furst & Rudolph; b, Eberlein.

LEMONT, ILL.—Stone front dwel, cost $9,000; o, Louis Roeler; a, Furst & Rudolph; b, not let.

OAK PARK, ILL.—Br and st dwel; cost $15,000; o, Wm. Clapp; a, Dixon & Townsend; b, Joel Bullard.

PHILADELPHIA, PA.—942 N. 9th st, mill; b, John Supplee.....Wellington, s of Montgomery ave, eight dwel; b, Thos. McCouch.... 510–12 Lombard st, two dwel; b, S. A. White....Cumberland nr Marshall st, five dwel; b, F. Hefling....707 St. John st, dwel; o, Wm. Outrop....Frankford road, n of Venango st, dwel; b, John Cunningham....Reese, n of Somerset st, five dwel; b, Duryee & Childs ...Wasser e of Cresson st, two dwel; b, Chas. Bartle ....Lehigh av, e of 6th st, three dwel; o, Chas. Kramer.... Ridge av, nr Damson st, two dwel; o, John Lehman....Germantown road, opp Fishers lane, eight dwel; o, T. C. Henry.... Germantown ave, s of Norris, dwell; b, C. H. W. Keyser.... Grape, e of 36th st, two dwel; b, Robert Crawford... Jefferson st, n of Mansion av, three dwel; b, C. J. Wallace ...502 Lehigh ave, three stores and dwel; b, Jacob Ebner Poplar and 27th st, seven dwel; o, Jacob Fleming....780, 2, 4 S. Sixth st, three dwel: b, N. H. Atkinson....1227–29 Filbert st, hotel build; b, Jos. M. Wells... 2234–36 Warnock st, two dwel; b, W. Schoenlober.... 1931 Bainbridge st, dwel; o, Jessie Wellf....Somerset, w of 6th st, dwel; b, John J. Baldt & Son ...Percy n of Poplar st, dwel; o, George F. Payne & Co....11th, n of McKean st, eleven dwel; o, Blaney Harvey....610 Locust st, factory, b, Geo W. Payne & Co ...2d st, n of Trenton av, factory; b, Atwater ...Emerald, e of Venan, four dwel; b, G. Gillback....Cadwalader. w of Montgomery st, add to factory; o, J. B. Stetson....21st, s of Reed st, four dwel; b, W. Forbes....Christian, w of Broad st, dwel; b, Thompson & Bros....N E cor 6th and Oregon, five dwel; o, R. Dawscieson....132 N Front st, four warehouses; o, Thos. Little ....Barlow, nr Wharton st, four dwel; o, A. M. Greene....6th, nr Wharton, five dwel; o. A. M. Greene . .Orthodox, w of Seiper st, dwel; b, Wilson Milnor.

READING, PA.—S and Elm st, br dwel; cost, $6,000; o, L. Repplier... 4th and Washingion sts, br dwel; cost, $9,000; o, T. Wilson....5th st, br school house; cost, $12,000; o, Presbyterian Congregation... 4th and Court st, engine house; cost, $7,250; o, City of Reading; a, Wm. A. Fink; b, H. & D. C. Kutz.

RIVERSIDE, ILL.—Fr dwel, cost some $10,000; o, E. C. Waller; a, Burnham & Root; b, not let....St and fr church, cost $10,000; o, St. Paul's Episcopal Parish; a. L. W B. Jenney; b. not let.

SALT LAKE CITY.—Main st, br hotel; cost, $10,000; o, Walker Bros.; a, Wm. Paul; b, Savil & Baker.

WASHINGTON, D. C.—7th st, bet 2d and R. I. ave, br dwel and cellar; cost, $5,000; o, J. Gockeler; b, Beha....14th st, between W and R. I. ave, br dwel and cellar; cost, $5,400; o and b, J. A. Jones... 14th st, extended Mt. Pleasant, st and br dwel; cost, $8,0 0; o, Gen. D. G. Swayne; a, Bright & Humphries... H. bet 9th and 10th sts, 3 br dwels; cost, $15,000; o, C. C. Duncanson; b, D. McCarty.

WHEELING, W. VA. –18th st, additions and alternations City Gas Works; cost, $10,000; o, City Dry Works. . 14th st, br residence; cost, $7,000; o, J. Fewer; a, Hamilton....14th st, two br dwells; cost, $12,000; o, J. Bodley.

MISCELLANEOUS.

BOSTON, MASS.—$630,000 has been vot ed by the aldermen for a new building for the public library.

BROOKLYN, N. Y.—A bank building is to be erected at the corner of Remsen st. and Court Square. The following architects have competed for the plans. Messrs. LeBrun & Son, H. R. Marshall, E. L. Roberts and Parfitt Bros.

BUFFALO, N. Y.—The corner-stone of the great Sängerfest Music Hall, has been laid. The building is to cost $160,000, and will seat 5,500 persons.

CANTON, N. Y.—Contract let for new br school house to Breath Wait & Kelly at $17,500.

CHICAGO, ILL.—Mr. George M. Pullman's architect is making designs for a new nine story office building. To be of brick with stone corner caps and sills, to be erected on the corner of Michigan av and Adam st. The cost is not yet decided. Negotiations are pending for the erection of a new depot on Forty-third street, this season....Albert Smith has made plans for the improvement of St. Andrew's Episcopal Church. The cost will be $6,000. Architects Treat & Foltz have plans for a building in the North Division to cost $100,000, to be built of pressed brick and brown stone. They will also build a dwelling on Michigan av, nr 26th st, of pressed brick and brown stone, to cost $40,000. The plans for St. Luke's Hospital, at Indiana av, nr 14th st, were made by Treat & Foltz. It will be from two to four stories high, have four pavilions and cost $125,000.

CLEVELAND, O.—Plans have been submitted by Mr. Levi T. Scofield to the County Commissioners for the court house. They were put over until the following meeting of the commissioners, and it is said are likely to be adopted.

EATON, O.—The town has voted in favor of a $30,000 schoolhouse.

FAIR HAVEN, N. J.—Rev. W. O. Embury, the rector of St. George's Church, Fair Haven, has undertaken the work of erecting an edifice to be known as the "Chapel of the Holy Communion." It will be a Gothic structure, of brick. with slate roof. The cost will be $8,000.

HALLOWELL, ME.—An Industrial School building for girls, to cos $10,000, is to be erected if the money can be raised.

HAMLINE, MINN.—Architect Hayes has drawings for a building t replace the Hambine University, recently destroyed by fire. It is to be commenced immediately.

HAVERHILL, MASS.—Charles F. Cate, mason, and Lewis Killam, carpenter, have the contract for the new Academy of Music, to be located on the site of the old Baptist Church, Merrimac Street. The building will be of brick and granite, and cost $150,000.

HYDE PARK, ILL.—H. J. Furber a wealthy resident of Henwood, will build about seventy-five dwelling houses of superior style, on the lake shore, near the Forty-third street station on the Illinois Central line. To cost from $5;000 to $7,000.

LURAY, VA.—Architect W. F. Weber has plans for a frame addition to the Lutheran Church, the front to be 38 feet wide; it will have a tower 60 feet high. The cost will be $16,000.

MONROE, WIS.—G. P. Randall is the architect of a schoolhouse which is to be built, costing $17,000.

MONTREAL.—The Municipal Council of Longueuil passed a by-law subscribing $25,000 to the Hope Cotton Company building to be erected at Longueuil

NASHVILLE, TENN.—March 26th. A building permit was issued to J. George Harris, for three frame residences on Joseph av. bet. Berry and Foster sts, to cost $2,100. Mr. J. W. Thomas has a permit to erect a two-story brick residence on Lindley avenue, near Maple street to cost $5,500. During the month of March building permits to the amount of $50,000 were issued.

NEW HAVEN, CONN.—Mr. A. E. Kent, of San Francisco, has given Yale College $60,000, with which a chemical laboratory will be erected.

NEW YORK.—Messrs. Robert and Ogden Goelet are about to erect an eight-story building on the northeast corner of Broadway and Nineteenth street. The building will cost $180,000; Edward H. Hendall is the architect; materials brick and Belleville blue stone, with the interior fire proof.

NIAGARA FALLS.—Tenders for building the post office and custo house at Clifton were withdrawn by the government, as too elaborate. The lowest tender was $32,000 and the highest $40,000. The government architect was instructed to draw new plans and call for tenders not to exceed $20,000, which will be done at once.

OHIO.—A bill has been reported from the Committee on Insane Asylums appropriating $600,000 for buildings at Athens, Cleveland and Dayton, and for purchasing land and erecting buildings in the northwestern part of the State The General Assembly have passed a bill appropriating $25,000 for Ohio State University. The money will be expended in the erection of a building for the department of Botany and Horticulture.

PORTLAND, ME.—The Casco-Street Society is soon to build a church on New High st.

RICHMOND, MASS.—John Flansburg has taken the contract to build a the new Congregational Church for $7,000.

ROCHESTER, N. Y.—James Wilson & Co. are about to erect a building on South Water st., to be of brick with Ohio stone trimmings. The dimensions are 75 feet on Water st, and 100 feet deep. Seven stories high on river, six on Water st. Mr. F. Tulley is going to build a new block on Exchange, st to extend back 140 feet to Aqueduct st. Messrs. Putnam & Block are the architects.

SPRINGFIELD, MASS.—Three plans have been submitted for the building of a two-story depot on Lyman street.

UTICA, N.Y.—Mar. 29th. Ground is broken for a new church building, cor. South st. and Taylor ave. It will be built of br, and cost $29,000; a, Thomas Birt. The owners are the members of St. Mary's Parish, under care of Rev. Father Fehling, priest.

WILMINGTON, DEL.—James Parker, is about to erect a fine house at Seventh and Broom streets.

DENVER, COL.—At an election held under the new charter of the city, Mr. H. C. Lowrie, was re-elected City Engineer for a term of two years, by 2,451 plurality over Leonard Cutshaw and Joseph R. Brinker. Mr. Lowrie ran 642 votes ahead of his ticket, with ex-Gov. Jno. L. Routt at the head for Mayor.

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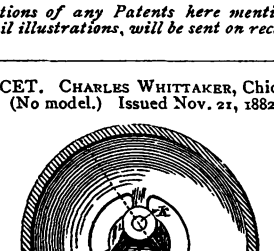
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

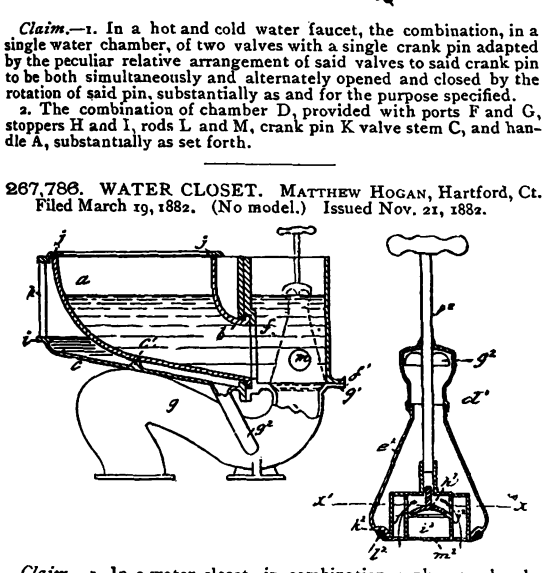
267,734. FAUCET. CHARLES WHITTAKER, Chicago, Ill. Filed June 12, 1882. (No model.) Issued Nov. 21, 1882.



Claim.—1. In a hot and cold water faucet, the combination, in a single water chamber, of two valves with a single crank pin adapted by the peculiar relative arrangement of said valves to said crank pin to be both simultaneously and alternately opened and closed by the rotation of said pin, substantially as and for the purpose specified.

2. The combination of chamber D, provided with ports F and G, stoppers H and I, rods L and M, crank pin K valve stem C, and handle A, substantially as set forth.

267,786. WATER CLOSET. MATTHEW HOGAN, Hartford, Ct. Filed March 19, 1882. (No model.) Issued Nov. 21, 1882.



Claim.—1. In a water closet, in combination, a plunger chamber and a tank having a communicating outlet whereby the water is drawn out of the tank when the plunger is raised, and inlet by means of which water is not returned to the tank until after the bowl and plunger chamber have become refilled, all substantially as described.

2. In a water closet, in combination, bowl *a*, plunger chamber *f*, tank *e*, partition *k*, with valve *m*, and overflow, all substantially as described.

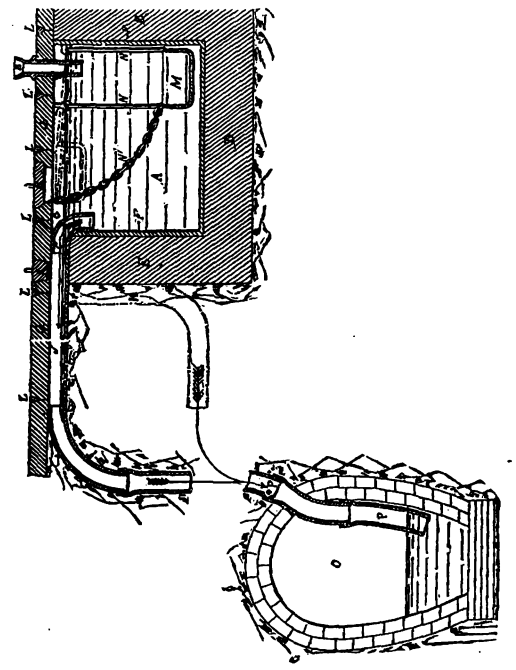
3. In a water closet, in combination, bowl *a*, plunger chamber *f*, plunger d^1, partition *k*, valve *m*, overflow tank *e*, cock *o*, and operating mechanism, all substantially as described.

4. In a water closet, in combination, bowl *a*, pan *c*, casting *d* and trap *g*, all substantially as described.

5. In a water closet, in combination, bowl *a*, pan *c*, casting *d*, trap *g*, and waste pipe g^2, all substantially as described.

6. In combination, in a plunger, a handle, f^2 case e^2, having overflow inlet g^2, and outlet passages $i^2 j^2$, interior valve, h^2, exterior groove k^2, and a packing ring l^2, all substantially as described and for the purpose set forth.

268,120. CESSPOOL. LOUIS MOURAS, Vesoul, France. Filed Apr. 5, 1882. (No model.) Patented in France Sept. 22, 1881, No. 144,904; in Russia Dec. 8, 1881; in England Dec. 9, 1881, No. 5,391; in Belgium Dec. 10, 1881, No. 56,454; in Germany Dec. 10, 1881, No. 18,641; in Austria Dec. 13, 1881, No. 41,450; in Italy Dec. 18, 1881, and in Spain Dec. 26, 1881, No. 2,365. Issued Nov. 28, 1882.

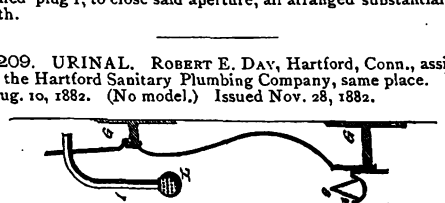


Claim.—1. The combination, with the hermetically-closed cesspool, of the inlet-pipe, the tray to receive the insoluble deposits, suspended below the inlet by links, the said links and the chain to raise the tray to the discharge-opening, all arranged substantially as set forth.

2. The combination, with the deep hermetically-closed cesspool provided with a sealed inlet-pipe, a hermetically-closed discharge-opening in its cover, and a sealed outlet near its top, of the tray M, suspended below the inlet and provided with means, substantially as shown, for swinging it up to the discharge-opening in the cover of the pool, as set forth.

3. The combination, with the hermetically closed cesspool provided with a suitable inlet, of the U-shaped discharge-passage J, the covering-flags G, having an aperture for the inspection of passage J, and the sealed plug I, to close said aperture, all arranged substantially as set forth.

268,209. URINAL. ROBERT E. DAY, Hartford, Conn., assignor to the Hartford Sanitary Plumbing Company, same place. Filed Aug. 10, 1882. (No model.) Issued Nov. 28, 1882.

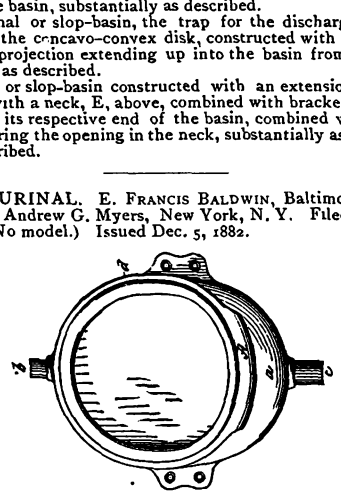


Claim.—1. A urinal or slop-basin constructed with a vertical extension, C, from the bottom of the basin, and with a vertical extension, E, at the top, the two extensions substantially concentric the one with the other, and in a line vertically through the basin, combined with brackets D and F, respectively, holding the lower and upper extensions from the basin, substantially as described.

2. In a urinal or slop-basin, the trap for the discharge-opening, consisting of the concavo-convex disk, constructed with the perforated hollow projection extending up into the basin from said disk, substantially as described.

3. A urinal or slop-basin constructed with an extension, C, at the bottom and with a neck, E, above, combined with brackets D and F, each holding its respective end of the basin, combined with a chimney, H, covering the opening in the neck, substantially as and for the purpose described.

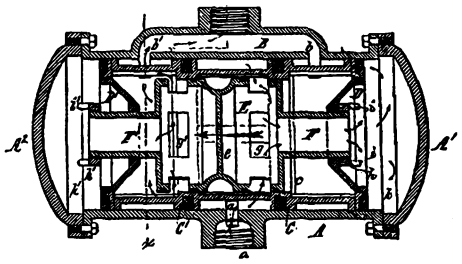
268,379. URINAL. E. FRANCIS BALDWIN, Baltimore, Md., assignor to Andrew G. Myers, New York, N. Y. Filed March 27, 1882. (No model.) Issued Dec. 5, 1882.



Claim—1.—A urinal having the edge of its bowl provided with an overhanging flange, A, substantially as and for the purpose set forth.

2. A urinal having the edge of its bowl provided with an overhanging flang, A, integral with the bowl, substantially as and for the purpose set forth.

268,387. PISTON WATER METER. HENRY CHANDLER, Buffalo, N. Y Filed Aug. 24, 1881. (No model.) Issued Dec. 5, 1882.



Claim.—1. The combination, with a cylinder, A, provided with an induction port, *a*, and two eduction ports, *b* b^1, on opposite sides of the centre line of the induction port, of a hollow piston, and a divided or double hollow valve arranged within the piston, whereby the liquid is alternately directed into opposite ends of the cylinder and alternately discharged from the eduction ports, substantially as set forth.

2. The combination, with a cylinder, A, provided with an induction port, *a*, and eduction ports, *b* b^1, of a piston provided with rings C C^1 and heads D D^1, and a divided or double valve, E, having ports *g* g^1 and open ends F F^1, substantially as set forth.

3. The combination, with a cylinder, A, provided with an induction port, *a*, and two eduction ports, *b* b^1, of a hollow piston, C C^1 D D^1, and a divided or double valve, E, sliding in the piston and provided with tubular ends F F^1, seated against the heads of the hollow piston, substantially as set forth.

4. The combination, with a cylinder, A, provided with an induction port, *a*, and two eduction ports, *b* b^1, of a piston provided with rings, C C^1, and heads D D^1, a valve, E, provided with a central partition, *e*, ports *g* g^1, and tubular ends F F^1, the latter projecting through openings in the heads D D^1 and provided with collars *k* k^1, substantially as set forth.

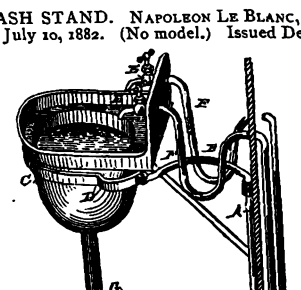
5. The combination, with the cylinder A, and a piston connected at its ends with annular heads D D^1, of recesses *k* k^1, formed at both ends of the cylinder and made wider and deeper than the annual heads D D^1, whereby when one of said heads projects into one of the recesses *k* k^1, at the end of the stroke, a communication is established around the head between the spaces on the front and rear sides thereof, substantially as set forth.

6. The combination, with a cylinder having an induction port, *a*, and a piston provided with rings C C^1, of a divided or double valve, E, provided with ports *g* g^1 on opposite sides of its partition, the ports being adapted to be opened on one side before they are entirely closed on the other side, substantially as set forth.

7. The combination, with a cylinder, A. provided with an induction port, *a*, and eduction ports, *b* b^1, of a piston provided with rings C C^1 and dished heads D D^1, all connected by bars, *c*, and a divided or double valve, E, composed of an enlarged middle portion sliding in the rings C C^1, and provided with ports, *g* g^1, and contracted tubular end portions F F^1, sliding in the heads D D^1, substantially as set forth.

8. The combination, with a cylinder, A, provided with an induction port, *a*, and eduction ports, *b* b^1, of a hollow piston, C C^1 D D^1, and a hollow divided or double valve, E, arranged to slide in said piston and adapted to have its movement arrested before the piston closes the eduction ports, substantially as set forth.

268,502. WASH STAND. NAPOLEON LE BLANC, Kansas City, Mo. Filed July 10, 1882. (No model.) Issued Dec. 5, 1882.

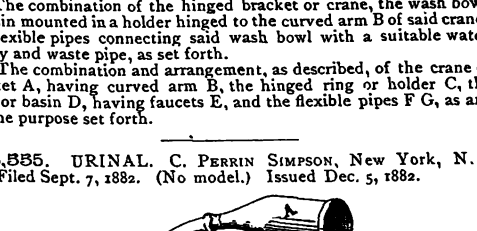


Claim.—1. The combination, with a hinged bracket or crane, having curved arm B, of a wash bowl or basin mounted in a ring hinged to said curved arm, as set forth.

2. The combination of the hinged bracket or crane, the wash bowl or basin mounted in a holder hinged to the curved arm B of said crane, and flexible pipes connecting said wash bowl with a suitable water supply and waste pipe, as set forth.

3. The combination and arrangement, as described, of the crane or bracket A, having curved arm B, the hinged ring or holder C, the bowl or basin D, having faucets E, and the flexible pipes F G, as and for the purpose set forth.

268,555. URINAL. C. PERRIN SIMPSON, New York, N. Y Filed Sept. 7, 1882. (No model.) Issued Dec. 5, 1882.



Claim.—The mouth piece, tubing, and cover, substantially as described, combined together for the purpose herein set forth.

267,746. STEAM TRAP. JEROME B. FULLER, and DWIGHT P. MILLS, Naugatuck, Conn. Filed Aug. 31, 1882. (Model.) Issued Nov. 21, 1882.

267,554. COMMODE. FRITZ MINK, Philadelphia, Pa. Filed May 6, 1882. (No model.) Issued Nov. 21, 1882.

267,760. REVOLVING TABLE FOR TILE MILLS. JOHN S. SMITH, Jackson, Mich. Filed July 27, 1882. (No model.) Issued Nov. 21, 1882,

267,761. STEAM GENERATOR. JAS. C. STEAD, Brooklyn, N.Y. Filed April 27, 1882. (No model.) Issued Nov. 21, 1882.

267,762. STEAM GENERATOR. JAS. C. STEAD, Brooklyn, N. Y. Filed Mar. 17, 1882. (No model.) Issued Nov. 21, 1882.

267,769. MAGAZINE DRUM STOVE. GEO. H. BARBOUR, and MERRILL B. MILLS, Detroit, Mich., assignors to the Michigan Stove Co., same place. Filed Apr. 4, 1882. (No model.) Issued Nov. 21, 1882.

267,780. WATER GAGE AND ALARM. PATRICK V. DWYER, Gloversville, N. Y. Filed Sept. 5, 1882. (No model.) Issued Nov. 21, 1882.

267,787. WATER COCK. MATTHEW HOGAN, Hartford, Conn. Filed June 10, 1882. (No model.) Issued Nov. 21, 1882.

268,157. ELECTRIC CABLE. RICHARD S. WARING, Pittsburg, Pa., Filed Sept. 14, 1882. (No model.) Issued Nov. 28, 1882.

268,158. LEAD-ARMORED ELECTRIC CABLE. RICHARD S. WARING, Pittsburg, Pa. Filed Aug. 23, 1882. (No model.) Issued Nov. 28, 1882.

268,159. UNITING AND BRANCHING ELECTRIC CABLES. RICHARD S. WARING, Pittsburg, Pa., Filed Sept. 21, 1882. (No model). Issued Nov. 28, 1882.

268,175. APPARATUS FOR CHARGING ELECTRIC STORAGE-BATTERIES. VIRGIL W. BLANCHARD, New York, N. Y. Filed July 24, 1882. (No model.) Issued Nov. 28, 1882.

268,176. HYDROCARBON-FURNACE, VIRGIL W. BLANCHARD, New York, N. Y., Filed Dec. 16, 1881. (No model.) Issued Nov. 28, 1882.

268,183. VENTILATOR. PEYTON CASSNER, Gould, Kan. Filed Apr. 4, 1882. (No model.) Issued Nov. 28, 1882.

268,251. WET GAS-METER. WILLIAM MACKINTOSH, Callao, Peru, South America. Filed July 22, 1882. (No model.) Issued Nov. 28, 1882.

268,256. FIRE-GRATE. GEORGE C. MAXWELL, Allenport, Pa. Filed Sept. 15, 1882. (No model.) Issued Nov. 28, 1882.

268,304. ECCENTRIC-SHAPED FILTER. LYMAN SMITH, Kansas City, Mo., Filed Nov 4, 1882. (No model.) Issued Nov. 28, 1882.

268,308. SECONDARY BATTERY. ELI T. STARR and E. EUGENE STARR, Philadelphia, Pa., assignors of one-half to William J. Peyton. Washington, D. C. Filed Oct. 6, 1882. (No model.) Issued Nov. 28, 1882.

268,331. DYNAMO-ELECTRIC MACHINE. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Compaay, New York, N. Y. Filed Aug. 31, 1882. (No model.) Issued Nov. 28, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MARCH 24th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	16	24.1	3	18.7	1		2				1					1						
Boston.....Mass.	407,581	179	22.8	55	30.0	7		39	5	2	7	2	3		1	22		12		4	3		
Cambridge.....Mass	57,432	11	9.9	2	18.1			3							2								
Worcester.....Mass.	64,995	32	25.6	11	34.4			6	1	1		1			1	5		3			1		
New Haven.....Conn.	66,979	20	16.1	7	35.0			3								2		1		1			1
Providence.....R. I.	116,755	41	18.2	13	31.4	1		6	1			1	1			7		2		1			1
Total	748,261	299	20.7	91	30.4	9		59	7	3	7	5	4		4	36	1	18		6	4		2
EASTERN CITIES.																							
Albany.....New York	98,430	42	22.2	15	35.7	1		7				1	2		3	5		1	1				
New York.....New York	1,299,249	734	29.1	245	33.3	17	6	121	9	17	27	8	4	19	24	128		38		21	11	1	5
Brooklyn.....New York	633,763	286	23.4	95	33.2	7		49	3	2	8	1	2	4	9	49	1	19	1		3		2
Hudson Co.....New Jersey	228,025	86	17.1	31	36.0	3		2	1		3	1			4	15		7			8	1	
Newark.....New Jersey	147,744	99	34.9					13	3	4	2		3		12	10			1				
*Camden.....New Jersey																							
Paterson.....New Jersey	58,324	23	20.3	9	39.1			4							1	2		3					
Philadelphia.....Pa.	907,043	420	24.0	136	32.3	3		54	3		11	4	18		10	48	8	10				5	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	25	27.6	6	24.0			5					2			3						2	
Total	3,419,467	1,715	26.1	537	31.3	31	6	255	19	23	51	15	31	23	63	260	9	88	3	21	22	9	8
LAKE CITIES.																							
Buffalo.....New York	168,702	121	36.9	46	38.0	6		21	2	3	1	1			6	9	1	3			7		
Rochester.....New York	92,116	34	18.7	6	17.6	1		8			1	1											
Syracuse.....New York	54,696	9	8.8					4		1				1		2		1					
Cleveland.....Ohio	192,084	70	18.7			1		11	6		9	2			1	6	2	4					2
Detroit.....Michigan	131,118	52	20.3	19	36.5			3	1		2	1				2	1	3					
Chicago.....Illinois	597,834	231	19.7	116	50.2	10	1	26	2	5	12		3	2	6	18	4	15	1		4		2
Milwaukee.....Wisconsin	135,233	43	16.1	22	51.1			4		1	4				1	3	1	2	1		4		
Total	1,371,783	560	21.2	209	37.3	18	1	77	11	10	29	5	3	3	14	40	9	28	2		15		4
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	79	21.3	27	34.1	4		8		1	1	1	6		1	5	1	2		1	2	2	1
Cincinnati.....Ohio	267,767	124	23.9	52	41.9	2	1	18	2	2	4	3	1	2	7	2		8	1	2	2		5
Dayton.....Ohio	47,648	16	19.7	5	31.2	1	1	2	2						1	1							
*Louisville.....Ky.																							
Indianapolis.....Indiana	86,529	26	15.1	7	26.9	1	1	9						2				1					1
*Terre Haute.....Indiana																							
Minneapolis.....Minn.	98,026	24	12.5	3	12.5	2		3	1		1					2	1				3	2	1
*St. Paul.....Minn.																							
*St. Louis.....Mo.																							
Total	685,493	269	20.4	94	34.9	10	3	40	5	3	6	4	7	4	9	10	2	11	1	3	7	4	8
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.....Wh.	136,471	75	28.0	27	28.0			11		1	1	2	1	1	4	13	1	1		1	2		
" " .....Col.	71,103	52	38.0	24	46.1			9			1				1	4	1	2			3		
Richmond, Va.....Wh.	38,526	15	20.3	3	20.0			2								2		1					
" .....Col.	29,304	17	29.6	7	41.1	1		2									1	1					1
Charleston.....S. C.....Wh.	22,699	4	8.8															1					
" .....Col.	27,595	25	46.8	5	20.0	1		5								3							
Atlanta.....Ga.....Wh.	25,583	7	14.0	4	57.1			2	1							1		1					1
" .....Col.	19,221	6	16.1	3	50.0			2								1							
*Savannah.....Ga.....Wh.																							
" .....Col.																							
Nashville.....Tenn.....Wh.	31,993	17	27.5	4	23.5	1		5								1	1	1			1	1	1
" .....Col.	19,406	4	10.4	1	25.0												1					1	
Memphis.....Tenn.....Wh.	18,677	14	38.5	1	7.1	1		2						2		2							
" .....Col.	14,896	14	48.4	6	42.8			2								4		1					
*Mobile.....Ala.....Wh.																							
" .....Col.																							
New Orleans.....La.....Wh.	163,757	104	32.8	20	19.2	2		13		4	2			4	1	9			1			25	
" " .....Col.	59,866	75	65.1	21	28.0	1	1	3		1				4		7			1			40	
Total White	437,706	236	28.1	53	22.4	4		35	1	5	3	2	1	7	5	28	2	5	1	1	3	26	2
Total Colored	241,481	193	41.1	67	34.7	3	1	23		1	1			4	1	19	3	4	1		8	41	1
Total in 33 U. S. Cities	6,904,191	3,272	24.6	1,051	32.1	75	11	489	43	45	97	31	45	41	86	393	26	154	8	31	54	80	25
Mar. 10—Total in 28 English Cities	8,620,975	3,801	23.0			152				27	25		54		65					41		5	110
Mar. 10, " 8 Scotch Cities	1,233,088	626	26.4			18				4	18		11		9	149				22			47
Mar. 3, " 16 Irish Cities	854,731	524	31.9			6		71		9			6		14	134				3			15
Feb. 24, " 170 German Cities	8,699,235	4,417	26.4	1,991				707	36	191	166		58		68	614				40	25	3	70

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an urban population of 6,904,191, there died, during the week ending March 24, 3,272 persons, which is equivalent to an annual death rate of 24.6 per 1,000, an increase on that of the preceding week, which was 23.4 per 1,000.

For the North Atlantic cities the death rate was 20.7; for the Eastern cities 26.1; for the lake cities 21.2; for the river cities 20.4, and in the Southern cities, for whites, 28.1; and for the colored 41.1 per 1,000.

The death rate continues especially high in New York city (29.1), in Wilmington (27.6), in Memphis (white 38.5, colored, 48.4), and in New Orleans (white 32.8, colored 65.1). It is also very high in Newark (34.9), in Buffalo (36.9) and in the District of Columbia (white 28.0, colored 38.0).

Consumption caused 14.9 per cent. of all the deaths. In the North Atlantic cities it caused 19.7, in the Eastern cities, 14.8, in the lake cities, 13.4; in the river cities 14.8, and in the Southern cities, 14.8 among the whites and 11.9 among the colored. Diphtheria caused 2.9 per cent. of all deaths. In the North Atlantic cities it caused 2.3; in Eastern cities 2.9; in lake cities 5.1; in the river cities 2.3; and in the Southern cities 1.2 among the whites, and .5 among the colored.

Typhoid fever caused 1.3 per cent. of all deaths. In the North Atlantic cities it caused 1.0; in Eastern cities, 1.8; in the lake cities, .5; in the river cities, 2.6; and in the Southern cities, among the whites, .4, and no deaths among the colored population. The greatest mortality from this disease occurred in Philadelphia, where it caused over 4 per cent. of all deaths.

Malarial fevers caused 1.2 per cent. of all deaths. The highest proportion occurring among the white inhabitants of Southern cities, where it was 2.9 per cent.

Scarlet fever caused 2.6 per cent. of all deaths. In the North Atlantic cities it caused 1.3; in the Eastern cities 3.6; in the lake cities 2.5; and in the river cities 3.3

Pneumonia caused 12.0 per cent. and bronchitis and congestion of of the lungs 5.2 per cent. of all deaths. In the North Atlantic cities

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MARCH 31st, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	15	22.6					7								1	1	1			1		
Boston.....Mass	407,581	188	24 0	62	33.0	3		37	3	1	7	2	3		3	27		15		2	2		
Cambridge.....Mass	57,432	25		7		1		6	1		1		1		1	4		1					
Worcester.....Mass	64,995	26	20.8	11	42.3	1	1	2	2							7		1					
New Haven.....Conn	66,979	36	27.9	10	27.7			3							1	4		2					
Providence.....R. I	116,755	37	16 4	7	18.9	1	1	7				2	5		1	8							
Total	748,261	327	22 7	97	29.6	6	2	62	6	1	8	4	9		6	51	1	20		2	3		
EASTERN CITIES.																							
Albany.....New York	98,430	50	26.4	9	18.0	1	1	11		1			2			3	1	3					
New York.....New York	1,299,249	727	29.1	262	36.0	14	8	132	18	11	14	4	7	15	25	113		51		20	11	2	7
Brooklyn.....New York	633,763	286	23.5	98	34.2	7		42	10	3	5	4	2	5	18	43	2	16	1	2	3	1	5
Hudson Co.....New Jersey	220,025	92	21.7	41	44.5	4	1	5	4		6				11	11	1	2	2		8		
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	17	16 3	4	23 5			3	1						1								
Paterson.....New Jersey	58,324	23	20 5	7	30.4			5					2			1					1		
Philadelphia.....Pa.	907,043	425	24.3	118	27.7	6		67	13		14	4	20		5	48	6	5				9	
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	21	23.3	10	47.6										1	2						4	
Total	3,317,731	1,641	25.7	549	33.4	32	10	265	46	15	39	12	33	20	61	221	10	87	3	22	23	16	12
LAKE CITIES.																							
Buffalo.....New York	168,702	53		15		1		6	1		3	1			1	3	3	1					
Rochester.....New York	92,116	21	22.7	4	19.4	1		3		1						2							
*Syracuse.....New York																							
Cleveland.....Ohio	192,084	48	18.0				1	5	1		3		1			6	2	1					
Detroit.....Michigan	131,118	55	21.8	16	29.0			14	2		7				1	6		4			1		
Chicago.....Illinois	597,834	250	21.7	136	54.4	2	2	25	2	9	14	3	6	1	13	19	2	11		1	6	3	4
Milwaukee.....Wisconsin	135,233	40	15.8	17	42.5	1	1	5			2				3	5					1		
Total	1,317,087	467	18.4	188	40.2	5	4	58	6	10	29	4	7	1	18	41	7	17		1	8	3	4
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	71	19.2	26	36.6	5	2	14			1		3		1	12	2	2	1		1		1
Cincinnati.....Ohio	267,767	145	28.3	54	37.2	3		20	1	2		3	1		8	34	1	7	1	4	2		4
Dayton.....Ohio	41,648	16	20.0	3	18.7			5						1		3				1			
*Louisville.....Ky.																							
Indianapolis.....Indiana	86,529	21	12.6	4	19.0		1	8		2			1			1							
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	26	13.8	7	26.9	2	1	4			1		2			1							
*St. Paul.....Minn																							
St. Louis.....Mo	362,816	141	20.2	56	39.7	6	2	21	3	3	12		2	3	7	11		5			2		
Total	1,048,309	420	20.8	150	35.7	16	6	72	4	7	14	3	9	4	16	62	3	14	2	5	5		5
PACIFIC CITIES.																							
*San Francisco.....Cal																							
SOUTHERN CITIES.																							
District of Columbia.. ..... Wh.	136,471	46	17.5	10	21.7	2		6	1		3			1	3	8	2					1	
" " ..... Col.	71,108	34	24.9	14	41.1	2		9					1			7	1	1					
Richmond, ... Va. Wh.	38,526	13	17.5	6	46.1			1									1						2
" ..... Col.	29,334	19	33.6	9	47.3	1		3								3	1						1
Charleston ..... S. C. Wh.	22,699	6	13.7	1	16.6			1								1	1						
" ..... Col.	27,595	22	41.5	4	18.1			3		1						4		1					
Atlanta ..... Ga. Wh.	25,583	6	12.1	2	33.3	1											1						1
" ..... Col.	19,221	7	18.9	3	42.8			2								1		1					
*Savannah..... Ga. Wh.																							
" ..... Col.																							
Nashville ..... Tenn. Wh.	31,993	19	30.8	6	31.5		1	3	1						1	4				1		1	
" ..... Col.	19,406	21	56.2	9	42.8			2	1	3						5				1		3	
Memphis ..... Tenn. Wh.	18,677	13	36.2	4	20.7		1	2				1											1
" ..... Col.	14,896	21	77.6	6	28 5	1	1	2					1			7							
*Mobile..... Ala. Wh.																							
" ..... Col.																							
*New Orleans..... La. Wh.																							
" " ..... Col.																							
Total White	273,949	103	19.5	29	28.1	3	2	13	2		3	1		1	4	13	5			1		2	4
Total Colored	181,615	124	35.5	45	36.2	4	1	21	1	4			2			27	2	3		1		3	1
Total in 32 U. S. Cities	6,886,952	3,082	23.2	1,058	34.3	66	25	491	65	37	93	24	60	26	105	415	28	141	5	32	39	24	26
Mar. 17—Total in 28 English Cities	8,620,975	4,300	26.0			112				39	28		61		67					78		7	119
Mar. 17, " 8 Scotch Cities	1,233,088	682	28.8			20				11	13		11		5	117				18			57
Mar. 17, " 16 Irish Cities	854,731	537	32.7			9		60		8			5		10	155				2			24
Mar. 3, " 172 German Cities	8,737,203	4,281	25.5	1,850		93	38	701		155	157		38		77	547				31	24	3	47

pneumonia caused 12.0 per cent. of all deaths, in the Eastern cities 15.1; in the lake cities 7.1, in the river cities 3.7, and in the Southern cities 11.8 per cent. among the whites and 9.5 among the colored.

It will be found interesting to compare the percentages with those given in the SANITARY ENGINEER for the two preceding weeks. Small-pox caused 2.4 per cent. of all deaths, but 67 out of the total of 76 deaths occurred in New Orleans alone.

Of an urban population of 6,886,952 there died during the week ending March 31, 3,082 persons, which is equivalent to an annual death rate of 23.2 per 1,000.

For the North Atlantic cities the death rate was 22.7; for the Eastern cities 25.7; for the lake cities 18.4; for the river cities 20.8; and in the Southern cities, for whites 19.5 and for the colored 35.5 per 1,000.

Consumption caused 15.9 per cent of all deaths. In the North Atlantic cities it caused 18.9; in the Eastern cities 16.1; in the lake cities 12.4; in the river cities 17.1; and in the Southern cities for the whites 12.6 and for the colored 16.9 per cent.

Diphtheria caused 3.0 per cent of all deaths. In the North Atlantic cities it caused 2.4; in the Eastern cities 2.3; in the lake cities 6.2; in the river cities 3.3; and in the Southern cities, for the whites 2.9 per cent.

Typhoid fever caused 1.9 per eent of all deaths. In the North Atlantic cities it caused 2.7, in the Eastern cities 2.0; in the lake cities 1.4; in the river cities 2.1; and among the Southern colored 1.6 per cent.

Scarlet fever caused 3.4 per cent of all deaths. In the North Atlantic cities it caused 1.8; in the Eastern cities 3.7; and in the lake, river, and Southern cities (whites) 3.8 per cent.

Pneumonia caused 13.4 per cent of all deaths. In the North Atlantic cities it caused 15.5; in the Eastern cities 13.4; in the lake cities 8.7; in the river cities 14.7; in the Southern cities for whites 12.6 and for colored 21.7 per cent. The death rate coutinues high in New York City (29.1; per 1,000.)

LYNCHBURG, VA.—Dr. Thos. L. Walker reports March 31 the disappearance of small-pox from the city.

PATERSON N. J.—Dr. W. K. Newton reports that 19 cases of scarlet fever were officially noted during the month of March.

BOSTON, MASS.—C. E. Davis, Jr. reports 23 cases of diphtheria, 21 of scarlet fever and five of typhoid fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 29 new cases of scarlet fever and five of diphtheria, making 50 of the former disease under treatment and ten of the latter.

PROVIDENCE, R. I.—Dr. E. M. Snow notes a considerable increase of typhoid fever in the last ten or fifteen days, 40 new cases having been reported. "This increase of typhoid fever, at this season, is very unusual, it being especially a disease of the autumn. Though it is evident that there must be some general cause for the fever, probably atmospheric, yet it is a well established fact, that in a large majoritv of the cases, there is some local cause within the house or premises, which can be discovered, and which might be removed and without which the case of fever would not be produced."

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DETROIT, MICH.—Dr. O. W. Wight reports 12 cases of diphtheria and 14 of scarlet fever.

PITTSBURG, PA.—Dr. Snively states that no new cases of small-pox were reported during the week.

NEW YORK CITY LUNATIC ASYLUM.—Dr. T. M. Franklin reports 1,340 insane patients remainding under treatment March 31. The changes during the week were six admitted, two discharged and five died.

MOLINE, ILL.—Dr. L. D. Dunn report March 31, that there is no small-pox in Moline. A case was reported recently, but there proved to be a mistake in the diagnosis.

PEABODY, MASS.—Dr. C. C. Pike, reports the prevalence of measles of a severe type.

BALTIMORE, MD.—There were 182 deaths in Baltimore, during the week which ended March 31 ; Males 92, females 90 ; under five years 69, over 60 years 25. The annual rates per 1,000 calculated on the mortality of the week, and on the population as estimated by the local authorities (white 348,900, colored 59,620) were for the whole population 23.14, for the white 19.96, for the colored 41.60. Small-pox caused only four deaths during the week. Twenty-two deaths are reported as occasioned by consumption, five by croup, seven by diphtheria, one by typhoid fever, 10 by scarlet fever, 12 by pneumonia, one by bronchitis, two by pleurisy, one by measles, one by puerperal fever, two by whooping cough and five by violence.

CAMDEN, N. J.—Dr. H. F. Palm's report for the week ending March 24, was not received in time for entry in our table. Deaths from all causes 24 ; deaths under five years five ; deaths caused by consumption six, by malarial fever one, by pneumonia one, and by bronchitis two.

NEW YORK CITY.—The reports of the Health Department, for the quarter ending Dec. 31, 1882, shows a total mortality of 7,669 as against 8,068 and 9,022 in the corresponding periods of 1880 and 1881. The deaths of children under five years numbered 2,763. Violence caused 327 deaths, small-pox, one, measles 57, scarlet fever 107, diphtheria 278, croup 170, whooping cough 98, typhus two, typhoid fever 133, puerperal diseases 67, diarrhœal diseases 408, consumption 1,308, bronchitis 365, pneumonia 775.

During the year 1882, 37,924 deaths occurred in the city of New York, giving a rate of 29.64 per 1,000 of its population of 1,279,560 as estimated to July 1, 1882. Violence caused 1,376 deaths, small-pox, 259, measles 913, scarlet fever 2,066, diphtheria 1,525, croup 729, whooping cough 658, erysipelas 149, typhus 65, typhoid fever 362, cerebrospinal fever 238, puerperal diseases 407, malarial fevers 540, diarrhœal diseases 4,050, consumption 5,251, bronchitis 1,583, and pneumonia 3,472.

CALIFORNIA.—The monthly circular of the State Board of Health for February gives an abstract of the deaths and their causes in 17 towns aggregating a population of 110,282. The total mortality was 141. Sixteen of the deaths were caused by consumption, 19 by pneumonia, five by bronchitis, eight by diphtheria, four by croup, two by scarlet fever, two by malarial fevers, eight by typhoid fever, one by cerebrospinal fever, and one by erysipelas. The annual rate per 1,000 was for the State 15.24, for the coast cities 12.60, (San Francisco, San José, Santa Barbara and other cities failed to make returns), for the Coast Valleys 13.80, for the interior valleys 20.78, and for the mountains 4.22. Six of the diphtheria cases were reported from Sacramento. Since last report a single case, so far as learned, of small-pox appeared in Napa, supposed to have been caused by handling hides from Arizonia where the disease has prevailed. Recently it has appeared in Nevada City, its origin not yet being known to the Board of Health.

ONTARIO, CANADA.—The prevailing diseases of the week ending March 24, were influenza, bronchitis, measles, neuralgia, anæmia and intermittent fever. Measles increased very considerably in degree and area of prevalence during the week. It constitutes 8.2 per cent. of the total diseases reported, while during the two weeks preceding it formed 5.15 and 6.6 per cent. of the respective totals.

CITY OF MEXICO, MEXICO.—There were 184 deaths during the week which ended Feb. 25; under five years 92, over 70 years five. Consumption caused 12 of the deaths, pneumonia and bronchitis 39, diarrhœal diseases 26. No deaths occurred from measles, scarlet fever, erysipelas or puerperal fever. Small-pox caused one death, croup and diphtheria two, whooping cough three and typhoid fever six.

RIO DE JANEIRO, BRAZIL.—Consul General C. C. Andrews reports the appearance and increase of yellow fever since the advent of warm weather. During the four weeks ending respectively on Feb. 3, 10, 17 and 24, the deaths numbered five, four, five and 14. The deaths from small-pox during these weeks numbered 26, 19, 12 and 22.

ENGLAND.—The return of the Registrar-General for the week ending Mar. 17, has been received. The annual rate of mortality averaged in the 28 large towns 26.0 per 1,000 of their aggregate population. Portsmouth registered the lowest rate, viz., 18.7, and Preston the highest, viz., 37.1. Whooping cough caused 13 deaths in Hull. Small-pox caused one death in London, three in Newcastle-on-Tyne, two in Birmingham and one in Hull.

London.—Births, 2,771; deaths, 1,854. The former are 62 below, and the latter 74 above the average numbers in the corresponding weeks of the last ten years. The annual rate which had been equal to 20.5, 21.0 and 21.7 in the three preceding weeks rose to 24.5. During the first 11 weeks of the current quarter, however, the rate averaged only 21.3 against 27.2, 23.0 and 26.0, in the corresponding periods of the three years 1880-82. The deaths included one from small-pox, 51 from measles, 20 from scarlet fever, 18 from diphtheria, 33 from whooping cough, and 20 from typhoid fever. The deaths referred to diseases of the respiratory organs rose to 548 or 62 above the corrected weekly average; 349 were attributed to bronchitis and 115 to pneumonia. Different forms of violence caused 57 deaths.

SCOTLAND.—In the eight principal towns the death rate for the week ending March 17, averaged 28.8 per 1,000. The lowest mortality was recorded in Greenock 16.7 and the highest in Dundee 34.8. A slight increase is observed in the mortality from zymotic diseases. Whooping cough continues to be the most fatal miasmatic disease.

Edinburgh.—Total mortality 104; rate 22.9. No death is reported from small-pox or scarlet fever. Measles caused one death, diphtheria three, whooping cough six, fever three, diarrhœal diseases two, acute diseases of the lungs 28 and violence two.

IRELAND.—Consul A. B. Wood transmits the return of the Registrar-General for the week ending Mar. 17, a summary of which is embraced in our weekly table. The report for the week ending Mar. 10 has failed to come to hand.

Belfast.—Mortality 135; rate 32.8. No death occurred from small-pox, typhus or diphtheria. Measles caused one death, scarlet fever seven, whooping cough nine, typhoid fever one, diarrhœal diseases four, consumption 13, diseases of the respiratory system 47, and violence one.

Dublin.—Mortality 229; rate 34.1. No deaths occurred from small-pox, measles, scarlet fever, or diphtheria. Typhus caused two deaths, typhoid fever three, diarrhœal diseases three, whooping cough 14, consumption 32, acute lung diseases 58 and violence five.

During the five weeks which ended Feb. 3, there were 1,023 deaths in the Metropolitan registration area, equal to an annul rate of 30.42 per 1,000. The births during the period numbered 1,025 or 30.5 per 1,000. No death was registered as caused by measles, small-pox or diphtheria. The only zymotic disease which attained to serious proportions was whooping cough, to which 42 deaths were attributed. Scarlet fever caused one death, typhus fever ten, typhoid fever six and diarrhœa and dysentery ten.

PARIS, FRANCE.—During the week ending March 14, 1,209 deaths were recorded ; males 689, females 520 ; under five years 343, over 60 years, 266. Typhoid fever caused 30 deaths, small-pox 13, measles 18, scarlet fever two, whooping cough 13, croup and diphtheria 38, dysentery one, erysipelas six, puerperal fever five, consumption 238, bronchitis 53. pneumonia 91, and violence 30. Annual rate 28.05.

On March 11 there remained under treatment in the hospitals 99 cases of small-pox, 202 of typhoid fever and 52 of diphtheria.

RHEIMS, FRANCE—Consul John L. Frisbie reports for the week ending March 10: Deaths 65, births 57. Annual mortality rate, 36.02 ; deaths in persons under five years 29, over 60 years 18. Whooping cough caused one death, croup and diphtheria two, typhoid fever one, bronchitis and pneumonia 11, consumption eight, diarrhœa one, and violence one. No death is reported from small-pox, measles, scarlet fever, erysipelas or puerperal fever.

MARSEILLES, FRANCE.—The *Bulletin* for February records 912 deaths in a population of 360,099 ; males 521, females 391 ; under five years 286, over 60 years 241. The births during the month numbered 897. A decrease is reported in the number of deaths from contagious or transmissible diseases: thus, small-pox, which caused 26 deaths in December, and 19 in January, was the occasion of only 16 in February ; measles caused 18 deaths as compared with 31 and 22 in December and January ; typhoid fever 32 as compared with 47 and 39 in the preceding months, and croup 23 as against 40 and 38. Whooping cough and scarlet fever caused one death each, consumption 92, bronchitis 51, pleurisy five, pneumonia 171, pulmonary congestion eight, dysentery three, diarrhœa and enteritis 46, puerperal fever two, and violence 26.

BRUSSELS, BELGIUM.—In the city and its *faubourgs* there occurred 290 births and 215 deaths during the week ending March 10. Of the deaths 94 were of children under five years of age. Small-pox caused three deaths, measles five, scarlet fever, typhoid fever and diphtheria one each, croup three, whooping cough two, diarrhœal diseases 26, bronchitis and pneumonia 45 and consumption 23.

ROTTERDAM, NETHERLANDS.—Consul John F. Winters reports six deaths from small-pox and 28 new cases of the disease as having been reported during the week ending March 10, and 18 new cases with seven deaths during the week ending March 17.

COPENHAGEN, DENMARK.—During the week ending March 6 there were 130 deaths recorded ; under five years 54, over 60 years 26. Annual mortality rate 24.76. Diphtheria caused one death, croup two, whooping cough six, typhoid fever one, consumption 15, pneumonia 17, acute bronchitis 13, and violence four. No death is recorded as caused by small-pox, measles, scarlet fever, diarrhœal diseases, erysipelas or puerperal fever.

During the same period the following number of cases were reported by physicians: Scarlet fever 28, diphtheria 10, croup four, whooping cough 45, typhoid fever five, diarrhœa 67, erysipelas 24, puerperal fever two, bronchial catarrh 309, pneumonia 61 and tonsilitis 125.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 96 deaths during the week ending March 3 ; males 51, females 45 ; under five years, 38 ; over 60 years, 19. No death was registered from small-pox, whooping cough, or typhoid fever. Measles caused five deaths, scarlet fever five, puerperal fever one, diphtheria and croup three, diarrhœa seven, consumption 11, pneumonia 12, bronchitis nine, and violence four.

The following cases were reported during the week ending March 10: Measles 44, scarlet fever 25, puerperal fever one, erysipelas two, whooping cough nine, diphtheria 11, pneumonia 15, pleurisy one, and bronchitis 91.

VIENNA, AUSTRIA.—Consul-General Jas. R. Weaver sends report for the week ending March 10. Total mortality 471 ; under five years, 172 ; annual rate 32.7. Diphtheria caused nine deaths, whooping cough nine, tyyhoid fever three, small-pox none, measles one, scarlet fever two, consumption 114, and acute diseases of the lungs 78.

ST. PETERSBURG, RUSSIA.—Consul Edgar Stanton reports for the week ending March 3, 744 deaths ; males 430, females 314 ; under five years, 329 ; over 60 years, 84 ; population 929,525. Fever caused 43 of the deaths and small-pox 14. On March 4 there remained under treatment in the city hospitals 1,209 cases of fever, 64 of small-pox, and 1,244 of venereal diseases.

Reviews of Books.

FIRST ANNUAL REPORT OF THE BOARD OF HEALTH OF KANSAS CITY, for the calender year 1882. Kansas City, 1883.

It has been a long time since we have seen a municipal health report which has pleased us more than this unpretending pamphlet of 44 pages.

Although it is entitled the Report of the Board of Health, it is really the report of the City Physician and Health Officer, Dr. John Fee, and it is a straightforward, common sense statement of what has been done and what ought to be done to preserve the public health in Kansas City, which is by no means confined to vague generalities and fine writing about the horrors of sewer gas.

The mortality of the city for the year, as calculated by Dr Fee, is extraordinarily low, being 14.5 per 1,000; so low as to make it extremely probable that his estimate of 70,000 as the population is too great and that it is more near 60,000. The total number of deaths was 1,023, of which three were due to scarlet fever and 10 to diphtheria. In each case during the last six months, where one of these two diseases has been reported, the house has been placarded, and the results are reported as gratifying.

As regards small-pox, the erection of a small-pox hospital is strongly urged and the argument is well put. He says : "There are two ways to protect any city from the ravages of this scourge ; these are vaccination of the people, as much as possible, and isolation of diseased persons in a hospital. One of the greatest benefits of removing to hospital is that all infected bedding can be removed with the patient, and subsequently destroyed. The health authorities can never control infected property in residences as well as they can when it is once in their possession at a hospital. Furthermore, at the time most persons would be removed to hospital the disease can scarcely be said to be contagious. Persons exposed to contact with small-pox most invariably escape infection before the fifth day of the disease, and not until the seventh day does it become highly dangerous and contagious. A good small-pox hospital is almost as useful to a city as a good fire department." In the discharge of official duty, Dr. Fee says that he has seen in the past two years three hundred cases of small-pox. He "frequently went into houses where the disease has been hidden for weeks, in which the air was saturated with the germs of the disease." He made regular inspections of the pest house, his lungs were filled with its loathsome air, yet he escaped without a symptom, although he had no other protection than vaccination. The physician in charge of the island hospital had no protection but vaccination, and such was his confidence in it that he took his family to live with him on the island at the hospital. The cook, also, and about one-half of the paid nurses of the hospital have had no other protection except vaccination, and all these parties escaped the disease. In many instances vaccinated members of a family were taken with their relatives as nurses, as provided for by law. In this way the mother or father accompanied children, the wife the husband, the brother a brother, the sister a sister. It is a singular fact that every vaccinated person who thus accompanied friends to the island escaped the disease, except in one instance, in which an old lady who went with her child, which died, had a few days of fever, and one or two patients from varioloid."

In October last Dr. Fee sent out a circular letter to the health officers of the large cities of this country, asking for information on various points with regard to municipal sanitation, and he prints some of the replies received, which we regret that we have not space to quote. A very considerable part of the report is devoted to questions of sewerage and house drainage, and the views are not only sound, but so stated as to be very good reading. For example : "There is one grave fault in the construction of sewers in this city, from a sanitary standpoint, and a sanitary standpoint covers everything in relation to sewers, as they have been invented strictly for sanitary purposes; that fault is the absence of man-holes, used as ventilators between catch basins."

A considerable space is devoted to house drainage. We notice an illustration submitted by one architect, and printed without comment, that is hardly a model in these days, though it may be better than work hitherto done in Kansas City. The City Council are urged to "pass a law which shall forbid any plumbing for house drainage in this city, unless the plans and specifications of the same shall

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: been approved by a Board on house drainage, which l consist of the city physician and city engineer *ex io.*"

t is well stated that "it is better to comprehend this ject now than to wait for years and then have to tear half the plumbing in this city."

BOOKS RECEIVED.

EVENTH REPORT OF THE BOARD OF TRUSTEES OF ILLINOIS INDUSTRIAL UNIVERSITY, URBANA, CHAMPAIGN COUNTY, ILLINOIS.

IDEMIC INTERMITTENT FEVER; ITS ANNUAL PROGRESS IN CONNETICUT AND OTHER PARTS OF NEW ENGLAND. By G. H. Wilson, M.D., Meriden, Member of the State Board of Health.

ODEL BY-LAWS ISSUED BY THE LOCAL GOVERNMENT BOARD FOR THE USE OF SANITARY AUTHORITIES. XVI.—OFFENSIVE TRADES. London: Knight & Co. Paper. Also same publisher, Model By-laws, etc., No. XV.—Mortuaries.

ONVERSION TABLES OF METRIC AND BRITISH OR UNITED STATES WEIGHTS AND MEASURES, WITH AN INTRODUCTION. By Robert Thurston, A. M., C. E., Professor of Engineering, Stevens Institute of Technology.

OTTENHAM SANITARY ASSOCIATION, NINTH ANNUAL REPORT, 1882.

REPORT OF THE JOINT SPECIAL COMMITTEE OF THE CITY OF NEWTON, MASS., ON THE SANITARY CONDITION OF THE SCHOOL HOUSE OF THAT CITY.

SOCRATES; A TRANSLATION OF THE APOLOGY, CRITO AND PARTS OF THE PHÆDO OF PLATO. New York: Charles Scribner's Sons, 1883.

ADULTERATION OF FOOD, being a Supplement No. III. to the Report of the Department of Inland Revenue, 1882. Printed by order of Parliament, London.

NINTH REPORT OF WEIGHTS AND MEASURES. Being Supplement No. II. to the Report of the Dapartment of Inland Revenue, 1882. Printed by order of Parliament, London.

We have received from Mr. C. L. Parsons, Boston, DIGEST OF THE STATUTES RELATING TO THE SANITARY INSPECTION OF BUILDINGS IN THE CITY OF BOSTON, 1882.

CENTRALBLATT FUR ALLGEMEINE GESUNDHEITSPFLEGE. ORGAN DES NIEDERRHEINISCHEN VEREINS FUR OFFENTTLICHE GESUNDHEITSPFLEGE. Herausgeben von Dr. Finkelnburg u nd Dr. Lent. Zweiter Jahrgang. Zweiter Heft. Bonn, Emil Straus, 1883.

PRIZE ESSAYS ON RIVER POLLUTION.

Prizes were offered in 1880, by his Majesty the King of Saxony, in connection with the International Fishing Exhibition, at Berlin, for the best essay on "The Pollution of Water Courses and its Prevention, with special reference to the Life and Health of Fish." None of the essays submitted, however, were adjudged worthy of the prize, and the King of Saxony has now transferred it to the committee of the German Sanitary Exhibition, to be awarded for the best essay on the following theme:

(*a*) What are the sanitary, industrial, agricultural, and other interests (including those of fishery) which are endangered and injured by the pollution of water courses, as caused partly by the utilization of them for various purposes, partly by the influx of refuse and sewer waters?

(*b*) Precise statement of chemicals, machines, architectural constructions, considered to be the most effectual means against such pollution, and demonstration of the chemical and economical practicability of propositions relating thereto. The addition of drawings, models, and preparations serving to give better explanations will be indispensable in certain cases.

The prize offered by the King of Saxony is a silver "jardiniere." The German Fishery Association also offers an award of 600 marks, and the Committee of the German Sanitary Exhibition offers two prizes of 100 marks each.

Manuscripts, etc., must be directed, post free, to Dr. P. Boerner, 8 Burggrafen Strasse, Berlin, W., before December 31, 1884, to whom all inquiries should be addressed.

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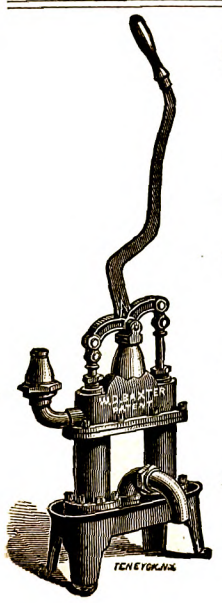

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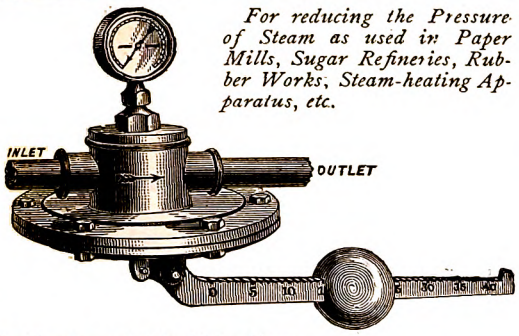

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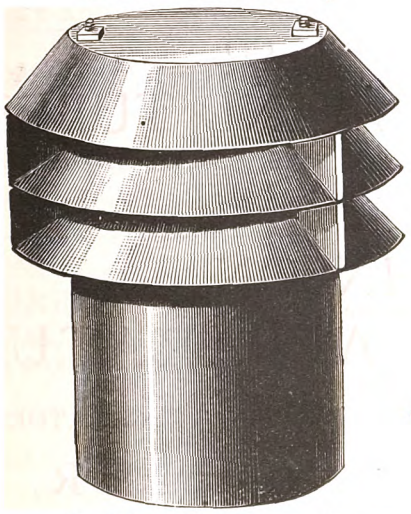

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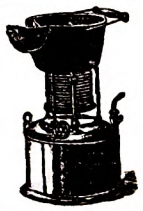

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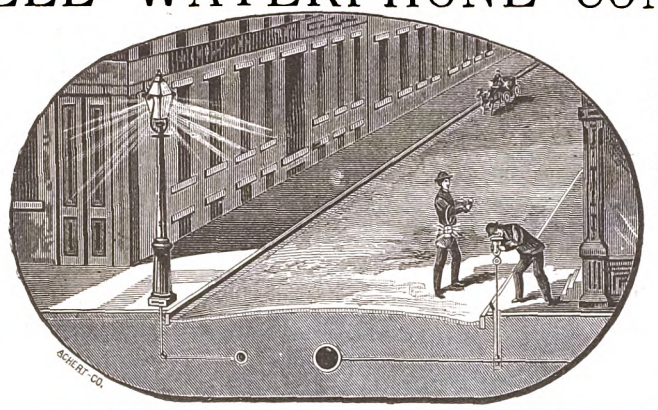

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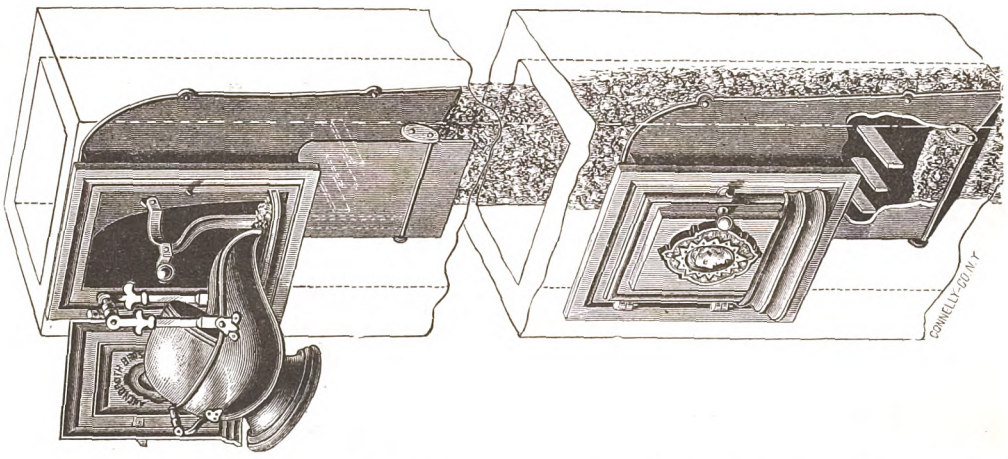

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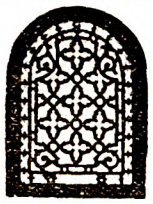

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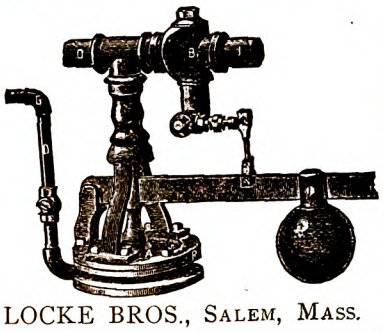

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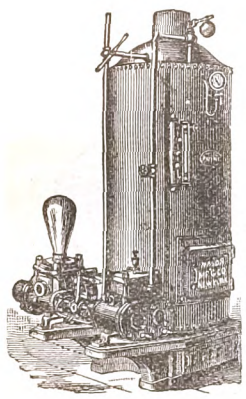

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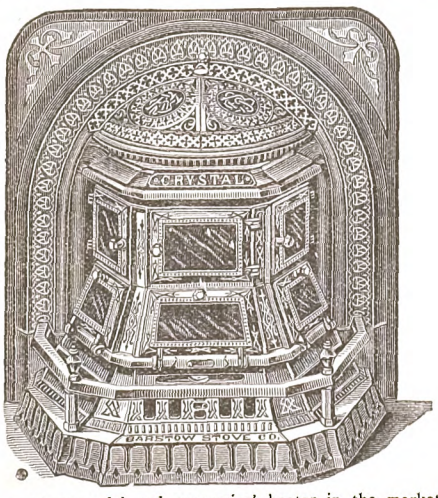

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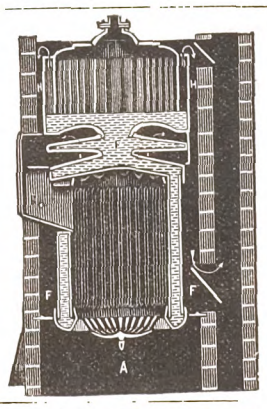

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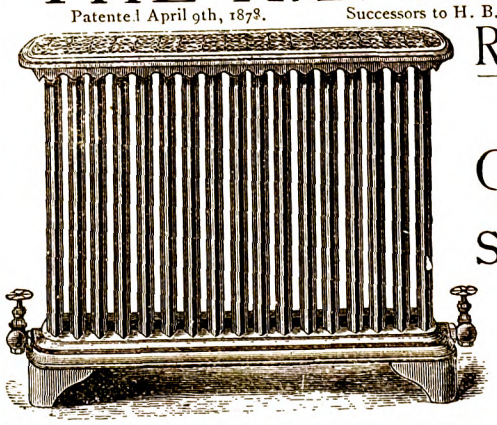

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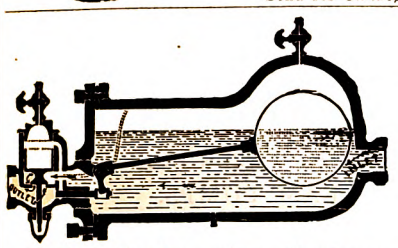

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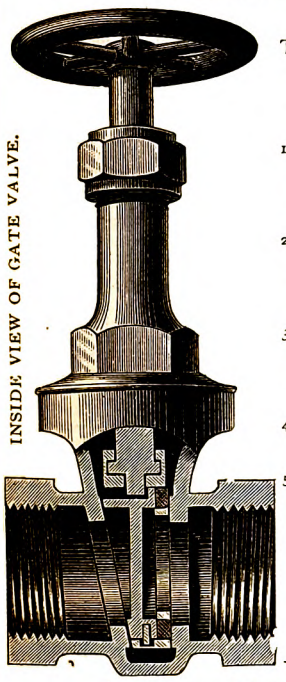

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The advantages these valves possess over all other gate valves, are—

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2d. As the disc of packing wears, the inclined follower (or metal seat,) keeps the disc to its seat, making a perfect joint.

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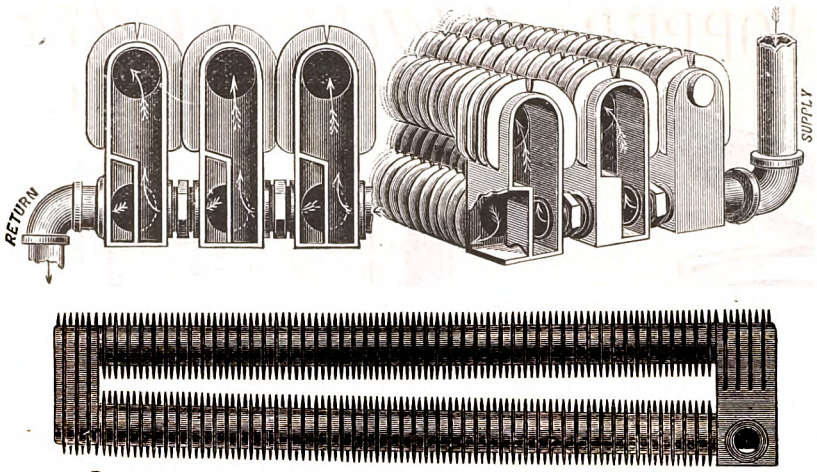

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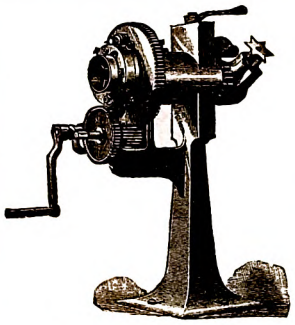

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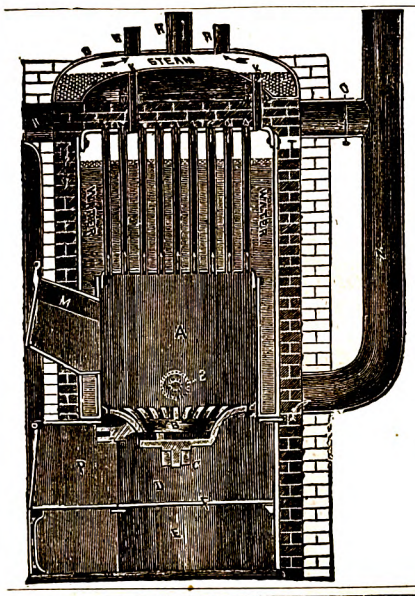

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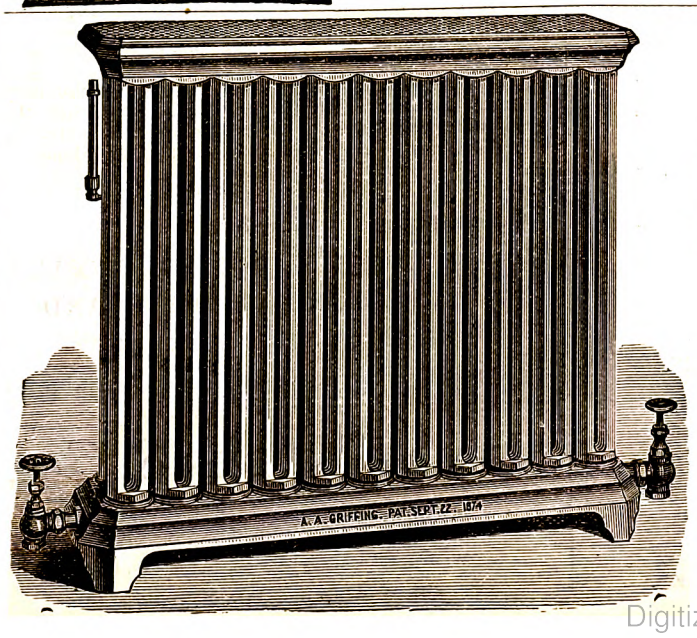

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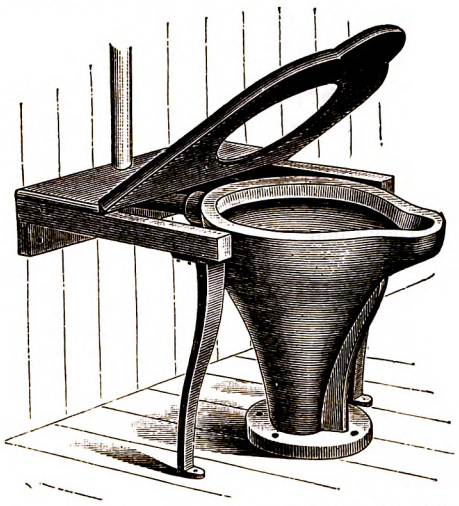

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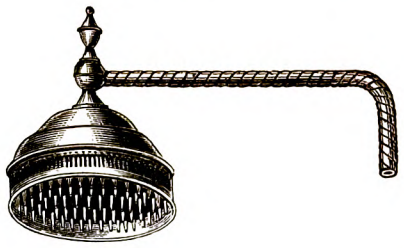

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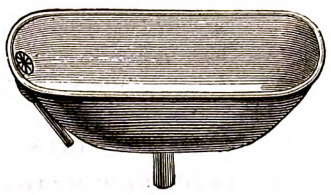

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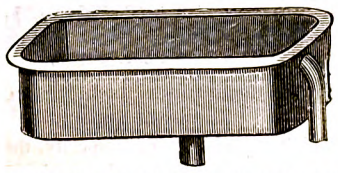

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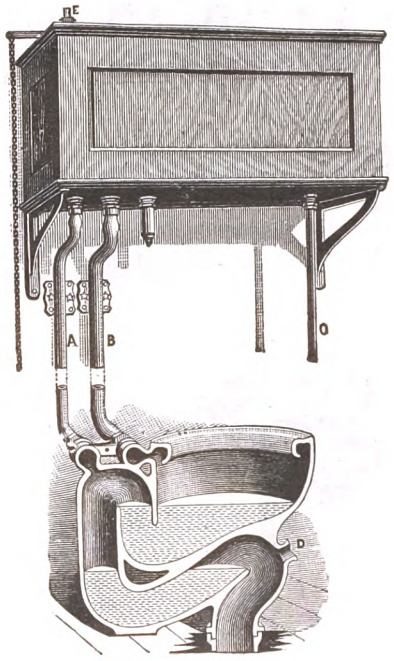

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Wherever in use, the closet has given entire satisfaction, and is recommended by leading authorities on sanitary matters as coming up to the requirements of a first-class appliance of its kind, being

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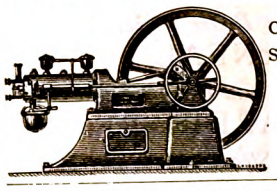

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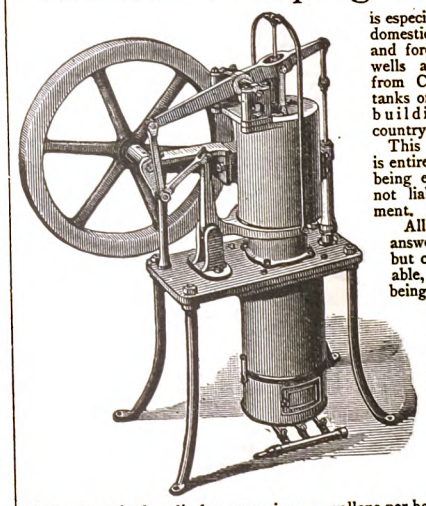

is especially intended for domestic use in lifting and forcing water from wells and cisterns, or from Croton pipes, to tanks on upper floors of buildings in city or country.

This pumping engine is entirely safe, no steam being employed, and is not liable to derangement.

All kinds of fuel will answer for this engine, but coal-gas is preferable, the consumption being only 15 cubic feet per hour. Besides, gas is handier and cleaner than coal or other combustibles. Servant girl can operate it.

Price for 6-inch cylinder, pumping 200 gallons per hour 50 feet: With gas furnace, $210. With coal furnace, $220

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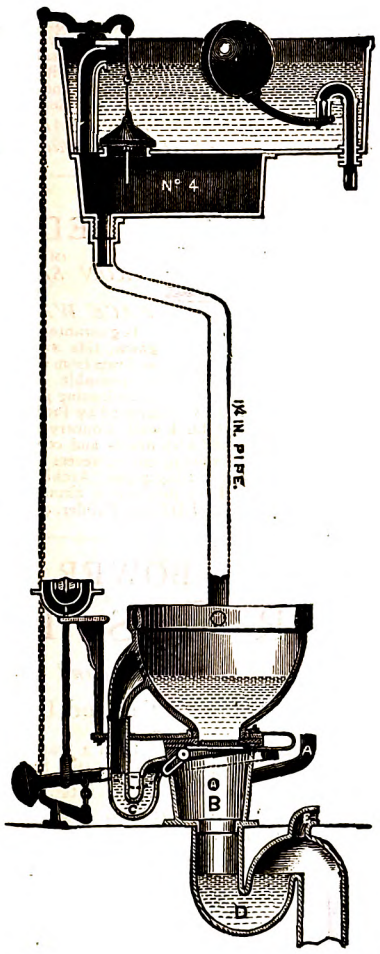
With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



The names of some of the parties using them and those having them for sale with full descriptive circulars, will be mailed on application to us.

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WITH IMPROVED FLUSHING RIM.

FLUSHED FROM OUR

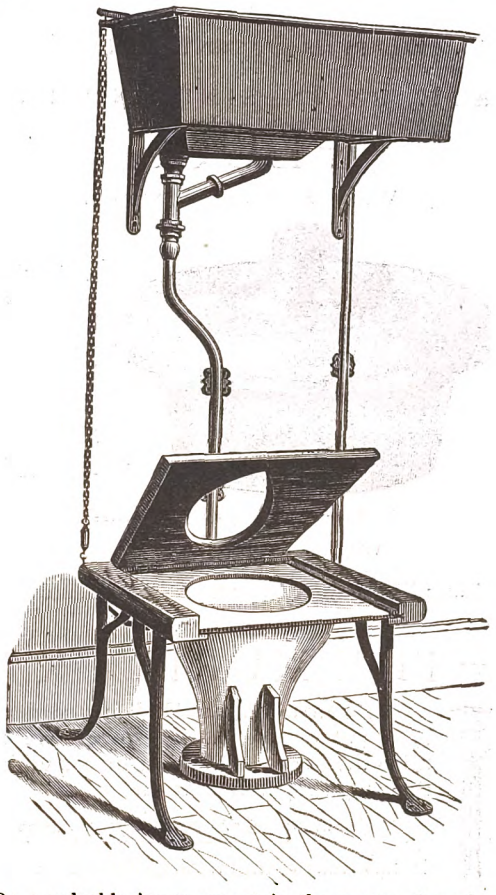
No. 2 A Preliminary Flush Cistern.

PATENTED.

Complete with seat, and all attachments ready for putting up, except lead pipe.

This is an admirable arrangement for Stores, Tenement Houses, Servants' Use, or any public place, where people neglect to lift the handle or properly flush an ordinary Water Closet.

This Hopper is of Earthenware, of novel shape, and with improved flushing rim, when supplied and fitted up as shown herein, always clean. When seat is depressed, a valve is raised, and Service Box filled with water, to extent of two and a half gallons. When seat is relieved of weight, the valve before referred to is closed, another one opened, when the contents are suddenly delivered through an 1¼ pipe to the Hopper, carrying all solid matter through the trap.



By a valuable improvement in the construction of our No. 2 Cistern—which is patented—a preliminary flush of half a gallon is secured, which thoroughly wets the entire inner surface of the hopper. The trickle is dispensed with, thus economizing the use of water, and very much better results are secured.

In ordering, describe as "*Meyer, Sniffin & Co.'s No. 3 A Water Closet Apparatus.*"

These Hellyer Hoppers are sold with various flushing apparatus, their efficiency largely depending on the selection. It is for this reason that we never sell the Hoppers unless we are satisfied that the flushing arrangements are suited for the particular duty required.

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IN ONE PIECE OF EARTHENWARE.

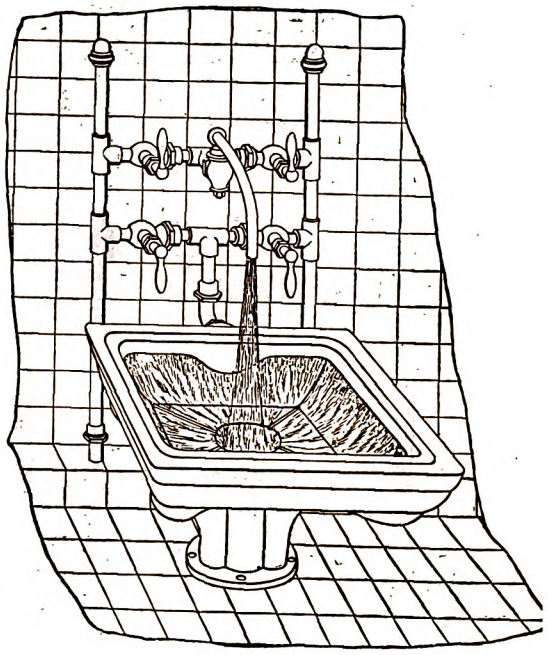
When set on and surrounded by White Glazed Tile, as shown, it makes the cleanest and most useful Slop Sink arrangement we know of.

It is provided with a Flushing Rim similar to the Hellyer Hoppers.

It is sold with the Flushing and Water Supply apparatus, that is made of Brass Pipe, as illustrated, or with a set of Combination Cocks to attach to Lead or Iron Pipes that may be concealed behind the wall.

It is arranged so that no overflow can take place when a pail may be set over the outlet hole and the water carelessly left running.

Persons wanting some such thing will find it worth while to take the trouble to call at our warerooms and examine it.



The apparatus complete, as shown, we designate as—

MEYER, SNIFFEN & CO.'S SLOP SINK APPARATUS, No. 40.

When the Combination Cocks and the Hoppers only are wanted, itis designated as—

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We have fitted up in our warerooms the various styles of Water Closet Apparatus that are to be taxed in this city $2.00, $5.00, $10.00 and $20.00 per year respectively. Architects, Plumbers, and Householders who may be interested, can there see which arrangement is best suited for their particular needs.

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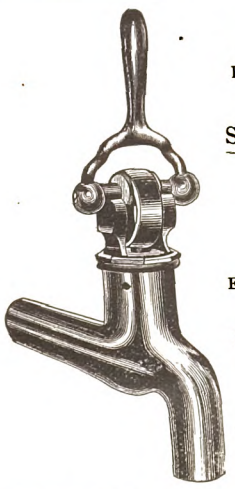

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Every one warranted

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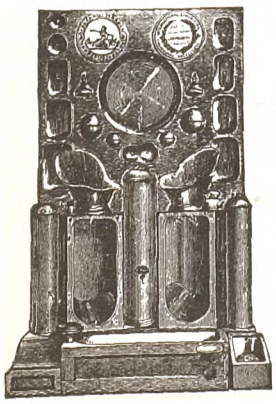

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Dealers in all kinds of TINNED AND PLANISHED COPPER.

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HENRY STEEGER 16 OZ. WARRANTED

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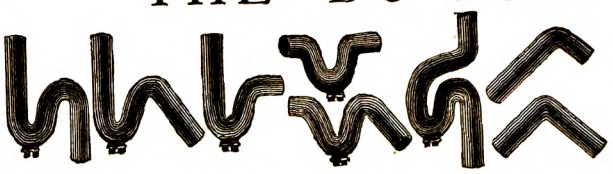
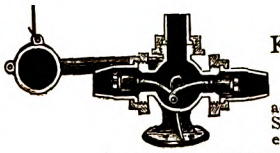


These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

For sale by all dealers in Plumbers' Supplies.



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adapted to all Plumbing Fixtures, Self-acting Water Closets, Urinals, etc. Send for Catalogue.

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A powerful and rapid exhaust Ventilator. Simple, cheap and effective.

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BATH, BASIN, SINK AND TRAY

PLUGS

WITH RUBBER STOPPERS.

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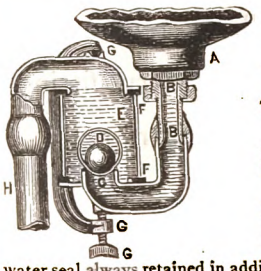

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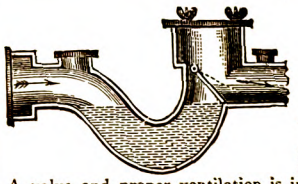

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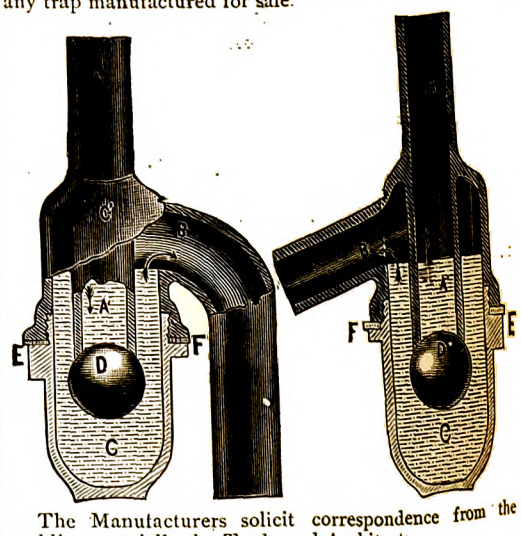

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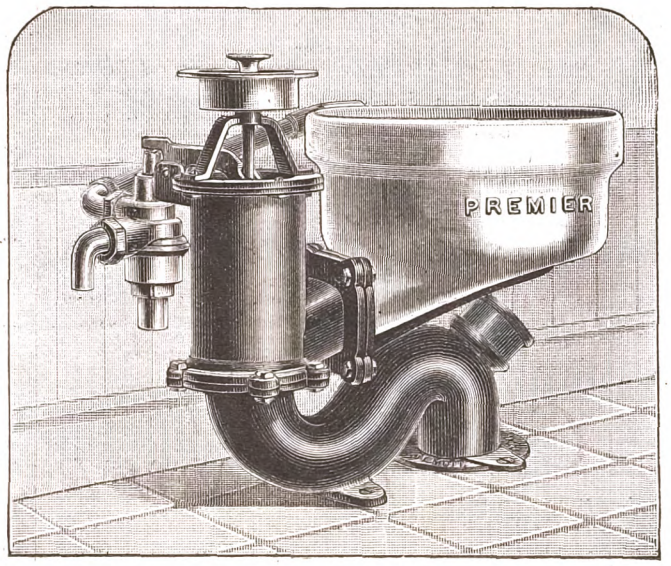

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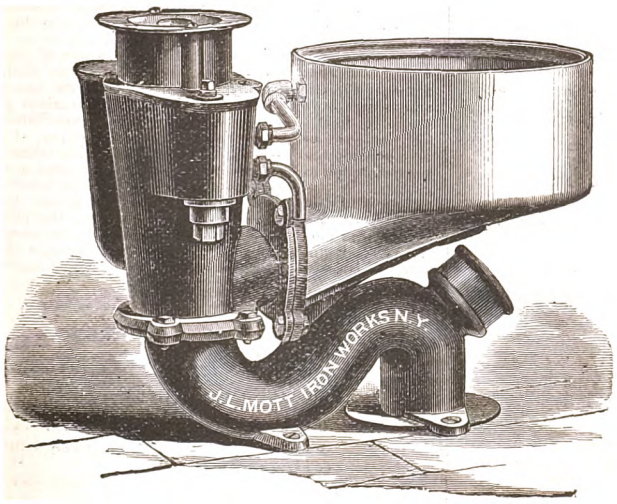

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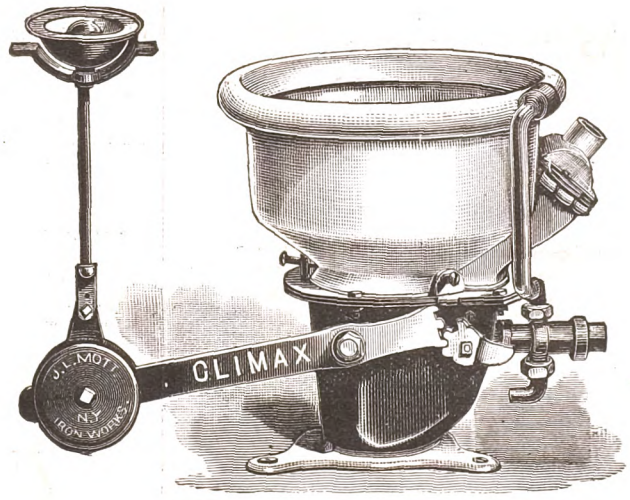

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WATER SUPPLY OF CITIES.

The consequences of the aggregation of population in one spot are far reaching. A casual observer would find it difficult to realize the fact that the existence of New York, Philadelphia and Boston has a direct effect on the comfort and the pockets of residents of wild and sparsely settled districts fifty or sixty miles from these centres of population, in regions untraversed by railroads and incapable of being made productive. And yet, the necessity for furnishing to the thronged denizens of the city a supply of the simplest necessary of life, pure water, is now causing a justifiable excitement in the minds of the farmers and property owners of remote rural regions in which water courses take their rise, and of more thickly settled and cultivated places through which these streams flow to the cities.

Both New York and Boston derive their water supply from limited areas. It has become necessary to store up the surplus waters of the wet season in order to supply the deficiencies of other seasons. This obliges large tracts of arable or pasture land in the valleys to be confiscated from the owners, and practically destroys many farms which have yielded a subsistance to their occupants for generations.

The borders of these artificial lakes are rendered uninhabitable in many instances.

Then the riparian owners on the stream below are deprived of the flow of water in the periods of filling or drawing down the ponds, and the supply of mills and factories is cut off.

More than that, it becomes essential that all the dwellers on the streams above the points where they are tapped by their larger neighbor shall be restrained from polluting the streams, and works of sewerage and of sewage disposal are forced upon them, at great expense in some instances.

The owners of property on the line of the Bronx River below the Kensico Reservoir, are reported to be organizing, and retaining expert engineers and sanitarians to claim damages for the diversion of the waters of that river to the New York water supply. The residents of the Croton Valley, near the proposed great storage reservoir, are said to be preparing to show that they will be ruined pecuniarily and sanitarily by its construction.

The cities and towns on the Schuylkill River above Philadelphia are expecting injunctions and interminable law suits, and probably costly constructions (both of law and engineering), because the Philadelphia water is unfit to drink.

The residents of the Sudbury River valley, near Boston, are aroused to a sense of the fact that their lands are taken from them, and their water privileges abridged, and that they are threatened with compulsory cleanliness, by reason of the City of Boston insisting that they shall not put their wastes in the stream which supplies water to that city. But there is no help for it, water for the cities must be had, and no private interests or convenience can be allowed to stand in the way of accomplishing this object.

THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

We print elsewhere an account of the meeting of the Sanitary Council of the Mississippi Valley, at Jackson, Mississippi, on the 3d and 4th of April.

A large number of boards of health, State and municipal, were represented, but the striking feature of the meeting was the presence of so many representatives of the commercial interests of the valley, in the form of delegations from cotton exchanges, merchants' exchanges, etc., and of railroad men.

At almost the last moment the Louisiana State Board seems to have concluded that discretion was the better part of valor, and forwarded some conciliatory resolutions, which the Council was strongly disposed to lay on the table, but finally—somewhat sarcastically, we fear—accepted "in the spirit in which they were offered."

The resolutions adopted by the Council indicate the purposes of the sanitary authorities of the valley with plainness and precision, and the election of Dr. Wirt Johnson, of Jackson, as President, and of Mr. Hadden, the Governor of Memphis, as Vice-President, is a sufficient guarantee, to those who are acquainted with these gentlemen, of the manner in which the wishes of the Council will be carried out.

STENCH-NUISANCES ON THE KILL VON KULL.

In January last certain residents of Staten Island made application to the Attorney-General for the abatement of the nuisances caused by the oil refiners on the Kill von Kull at Bayonne, N. J.

Several of the refiners agreed to abide by the decisions of the New York State Board of Health; and in order to ascertain the nature and extent of the nuisance complained of, an investigation was ordered by the Board. The inspection was made by Messrs. Colby, Walser and Hollick, and their report, together with the report and recommendations of the Board's Committee on Effluvium Nuisances, has been published.

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The inspectors made a thorough examination of the refineries at Bayonne and from their report it appears that there are four establishments, each of which is, to a greater or less extent, responsible for the nuisances. In most cases, the general drainage of the premises was found defective, and offensive matter found an easy outlet into the creek and thence into the waters of the Kill von Kull. Offensive gases from the still are often allowed to escape into the atmosphere during the operation of "blowing off." In two of the refineries tar is used to some extent as fuel, and its imperfect combustion gives rise to much smoke. Sludge acid, however, is largely responsible for the nuisance caused by these refineries. It is stated that the four establishments produce daily 6,496 gallons of this stuff. It has a commercial value of 2½ cents per gallon, and attempts are made to dispose of this refuse in a proper manner. It appears, however, that when it is more convenient to let it run into the creek, there is no hesitation in doing so; indeed, in some cases a pipe was found, the only use of which, apparently, was to divert the flow of acid from its proper receptacle into the creek.

The report contains suggestions by the inspectors as to what changes and improvements are needed in order to abate the nuisance.

It now remains to be seen how successful the Board of Health, will be in enforcing the required changes. Those refiners who agreed to abide by the decisions of the Board will doubtless do so, but others not so bound may need special treatment. The Board of Health will be most fortunate if their first efforts in this direction are successful. Certainly no commercial industry is of sufficient importance to warrant the continuance of a nuisance to a populous district, such as may be created by an oil refinery.

We recently wrote to the secretary of the New Jersey State Board of Health, to inquire if his Board had any appropriation last year, for the enforcement of the food adulteration law, which was passed about two years since, also for copies of any recent laws on sanitary matters. We thereupon received the following reply on a postal card.

TRENTON, *April* 12, 1883.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR.—I send you as desired. The law as to foods is now to our liking. We do not feel it the duty of the Board to chase every commercial fraud, however important that may be, but as a Board of Health to look after adulterations harmful to health.

Respectfully, E. M. HUNT, *Secretary*.

This assurance will no doubt be welcome intelligence to those manufacturers of fraudulent food products who have been annoyed by the recent activity of the New York State Board of Health, and who, in consequence thereof, have been contemplating the removal of their business to Pennsylvania, where there is neither a State Board of Health, or law to worry them. If the policy indicated in this communication is adhered to, the manufacturing of adulterated food is likely to become a prominent Jersey industry, since, in the matter of location, that State offers special inducements for the employment of capital in such enterprises.

Engineer Newton's report to the Commissioner of Public Works, of this city, very forcibly states the necessity for stopping waste and for possessing the necessary authority to act effectually in the matter. The press of the city also realize the importance of this question. The Legislature is soon to adjourn, and it would be most unfortunate if the Commissioner cannot find time to make the neccessary effort. Perhaps it is proposed to provide for this matter in the Aqueduct Commission bill; it certainly should be taken care of somewhere, and by this Legislature too.

The Assembly bill, which requires the placing of electric wires underground, has been so amended in committee as to exempt electric light and telephone companies. There is no good reason for exempting any electric wires from the provisions of this bill. All of them are alike objectionable in their present position, and we trust the movement to insert all that portion of the bill stricken out by the committee will prove successful.

STEAM FITTING AND STEAM HEATING.

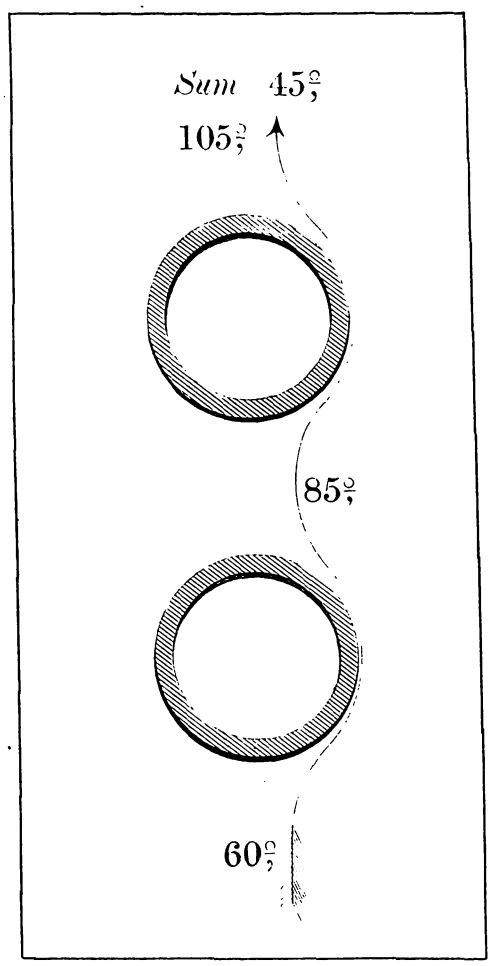
BY "THERMUS."

No. XX.

VALUE OF HEATING SURFACES (*continued*).

Usually, the metal employed in radiators is iron, either cast or wrought, and the questions are often asked, Which is the best for radiators? Which gives the most heat?

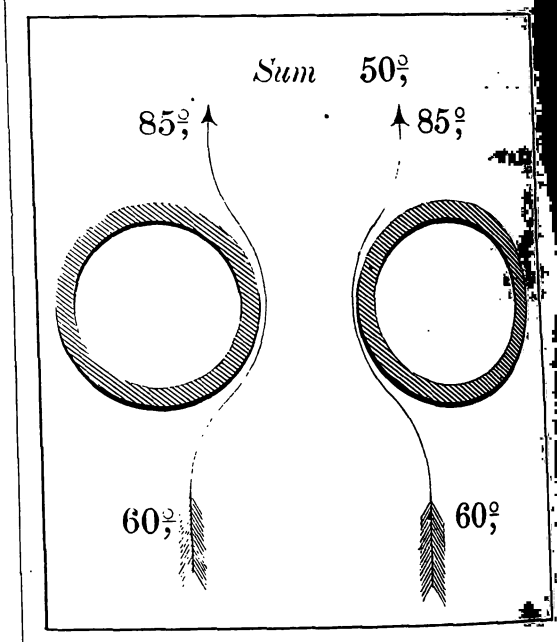
If we had only to consider the relative conductivity of the metals, all other things being equal, we would say there was a little in the favor of the cast iron; but when we consider that the transfer of heat through a radiator depends entirely on the rapidity with which the air comes in contact with the surface, and the



difference of temperature between the air and the radiator, we must answer: All other things being equal, wrought iron is as good as cast, and *vice versa* for radiators, and this is actually the case when both are painted, even though the nature of one or the other of the surfaces by being roughened or rusted, may make a slight difference before painting; though whether the difference is for better or for worse, is still a disputed question. If a surface is roughened, more heat is given off by radiation than if the same metal is polished, but when the same metal has a fine smooth surface, whether caused by a film of varnish or by polishing, the air will be warmed hotter by contact with it; or, in other words, the same air will take away more heat in the same time; and as the heat given off by radiation alone, at such temperatures as we have to deal with in warming by steam, is small compared to the heat taken away by the movement of the air—by convection—under the most unfavorable circumstances, the writer holds to the opinion, that the smooth surfaces are best, without any reliable data on the subject, only observation in practice.

There are cases where cast iron appears to do better than wrought iron—in plain vertical surfaces, for instance—but this is on account of the large, plain, surfaces and large interstices which allow a more free circulation of the air and of any difference in the metals. On the other hand, horizontal coils of small wrought iron pipe give the highest efficiency, and not because they are wrought iron, but because the tube is small; a cast iron tube of the same size doing the same duty, if it were practical to make it three quarters of an inch in diameter.

The question may be asked, Why should a small horizontal pipe (say one-inch) give off more heat per square foot of surface than a large pipe, say four-inch? And does the same apply to pipes in a vertical position? It does not apply to vertical pipes, but it does to horizontal ones, and more or less to all pipes, with their axis at right angles to the direction of the air currents; the difference being greatest for the right angle, lessening with the angle until they have equal values when in a parallel direction. The reason why the small horizontal pipe has a higher efficiency is because the air which touches it at the centre of the bottom and sides takes up what heat it can for the time of contact and leaves it almost instantly, while in the larger



pipe the air which strikes the bottom is warmed just the same in the same time as with the smaller pipe, but has to pass around the large pipe in its attempt to pass upwards, forming a warm envelope to the sides of the pipe, which lessens in capacity to extract heat proportionately to its own rise in temperature. For the same reason two one-inch pipes placed side by side will warm more air than one placed over the other, for the upper pipe can only increase the temperature of the air from the temperature at which it left the lower one, and not from the temperature of the room.

The diagrams, 1 and 2 may be made to illustrate this approximately. Say the air of the room is at 60°, at which temperature it strikes the lower pipe (Fig. 1), but leaves it at 85°, taking away 25° of heat from the lower pipe and striking the upper one at 85°, but leaving it at 105°, taking away only 20° more, making the sum of the heat 45°; but with the pipes side by side (Fig. 2) from *each* pipe is taken 25°, the same as in the lower pipe (Fig. 1); the sum of which is 50.°—ten per cent. in favor of the pipes side by side.

With vertical pipes the unit of surface has the same, or very nearly the same value for all size pipes, but it has the lowest comparative value as warming surface; the horizontal position having the highest value, with decreased efficiency as the angle progresses toward the perpendicular, caused by the warm envelope of

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air which has to follow the pipe a greater part of its length, or the whole length, in the vertical position, before being disengaged.

In radiators, when a difference of efficiency is found to exist, if it cannot be traced to a lack of steam, it should be looked for in the peculiar shape of the surface and the accidental position it may occupy.

For the same reason brass or copper radiators are no better air warmers, under ordinary conditions, than iron ones, though the conductivity of the metals is about double what it is for iron.

The thickness of the metal of radiators is again questioned, some claiming that the thinner the surface is the more heat can be given off in a unit of time. But this is also a mistake. After the metal is once warmed—at least for "plain surfaces," *i. e.*, with parallel sides—for the rate of the transfer of heat through the metal by the contact of its particles (its conductivity), is so many times greater than the capacity of the air to take away heat, under ordinary conditions, that it is not necessary to consider practical thicknesses for direct radiation, nor for indirect radiation where the surfaces are *plain*.

With extended surfaces the conditions are somewhat different, and vary with the kind of surface.

By extended surface is meant radiators for warming air which are increased in superficial measurement on the air side by points, cones, pins, ribs or indentations of too small a section to be cored out, while the centre steam opening is formed by a plain core of the most convenient form, which does not attempt to follow the indentations or irregularities of the outside.

A great deal of difference of opinion about extended surface is due to a misapprehension caused by viewing the question from only one standpoint.

Some claim that extended surface (generally) has the same value as plain surface, while a few claim better results for it (?), and the makers of plain wrought iron heaters claim it has a low value compared to pipe.

But to arrive at anything like a satisfactory conclusion on this subject, there is one thing that must be borne in mind continually, and that is, that it is a square foot of the outside surface in one form which is compared with the same measurement in any other form.

A maker of cast iron heaters, because he *can*, at a small cost of labor and materials, increase the surface of a section or pipe by extensions, and then tries it by the "condensation test" along side of one of the pieces before it was extended, and finds a greater amount of water formed in the same time, is very apt to go no farther with the experiment, but to come to the conclusion that the extended surface is the best, as he certainly condensed more water with it. But the point which is frequently lost sight of is, *has the increased condensation kept pace with the increased surface by extensions?*

But if we go farther, assuming that with the position of the two sections just tried, say a horizontal one, and with extensions of moderate length, say the base line at its shortest measurement to be greater than the perpendicular, that the results per square foot are the same, how long will the extensions have to be made before the extended radiator will fall behind in efficiency per unit of surface? for it is a question of length proportionate to the base. And again, if they are changed from the horizontal to the perpendicular, will the comparative results be the same, and will not the rapidity with which the air is moved over the surface effect the whole question, on the supposition that the extension has a base proportionate to its length, at which, with a certain velocity of the air, the conductivity of the iron is sufficiently great to keep the point of the cone at the same temperature as the base? With the air at greatly increased velocity, is this consistent, and does not this establish a point of unknown distance from the base, varying with the velocity of the air beyond which extended surface cannot have as great a value as plain?

Again, pipes of small diameter in a horizontal or nearly horizontal position may be extended to a limited degree, and give the same result as plain surfaces for equal quantities; but place them in a vertical position, where the air from the lower prongs or pins has to pass over all above it, taking less and less heat from each consecutive prong, and being retarded by friction, the result must be in favor of plain surface.

In extended surfaces, shapes which facilitate the movements of the air increase the value of the surface, as with any other kind of surface; perpendicular ribs giving better results than horizontal ones, as the coves formed by the horizontal corrugation hold air of a high temperature, while more air is rising at a line just beyond the points of the ribs, which has a higher velocity but a lower temperature. This last applies to any surface in this shape, whether plain or otherwise.

[To be Continued.]

SHOULD DRAINS BE EXPOSED OR COVERED?

Newport, R. I., *April* 7, 1883.

To the Editor of The Sanitary Engineer:

In reviewing the Philadelphia plumbing ordinance you recommend the adoption of the provision of the New York rules, that drains laid under the cellar floor should be laid in a trench, "walled up on the sides and provided with movable covers," etc. Let me suggest that such an arrangement provides a runway for rats and a space which is sure to accumulate dust and to harbor insects. Would it not be better, a suitable trench being first made, the extra heavy iron pipe laid, *and the tightness of its joints tested by water pressure*, to fill the whole space solidly full with grout to the surface of the cellar floor?

Very truly yours, Geo. E. Waring., Jr.

[The objections raised by Col. Waring do not appear to us to be valid. If a trench is walled up with brick laid in hydraulic cement, with a concrete bottom four inches thick and covered with flagging in a proper manner, neither rats nor insects can get into it, nor any appreciable quantity of dust.

We admit that if it were possible to ensure *perfect* workmanship and *perfect* materials, it might be advisable in some cases to bury a drain beneath a cellar floor. But we have to deal with the world as we find it, and we all know that perfection is not so easily attained in work that is to be buried out of sight as it is when the workman knows it is to be always visible, or at least ready of access. Such is human nature, and it is for the proper regulation of a community in which such human frailties are known to be common that laws and ordinances, like the one under discussion, are framed. It is much easier to make a line of drain that will stand a test when new than to make one that will endure for a term of years. Leaks and breakages sometimes occur from blow holes or imperfect or uneven castings, and if well tarred, these defects are not visible till time eats up the tar. Moreover, drains are continually made the receptacle of rubbish that should not be allowed to enter them, and will continue to be so used so long as a single house servant remains in the community who is not void of guile, or in other words, incapable of stuffing a towel, or even an old shoe into a water closet in a pet after having been discharged for incompetence. It is a matter of fact with which nearly all plumbers are familiar, that the drains in the best of houses are often opened to take out such obstructions. The writer once found a soil pipe choked by an india-rubber ball, soft and elastic, and used by the children indoors because it would not break glass, yet sufficiently firm to make a tight plug when accompanied by other substances that would be harmless by themselves. At another house a piece of beef-rib, several inches long, was the nucleus of a tight dam. Towels are probably more often met with than any other one article in such places, because they are often dropped into water closets through ignorance or inadvertance. The frequency of the need of cutting into drains, or getting access to them through hand-holes, is too manifest to admit of dispute.

It is needless to say that such troubles are greatly simplified by keeping drains accessible just as far as possible, or, at any rate, for every foot of their length within the walls of our houses, where the process of digging them out would be vexatious and annoying beyond reason. Of course, we can imagine exceptions where the rule in question might, perhaps, be varied without danger, but in framing such general rules, it is not admissible to provide for such isolated cases We must expect all manner of devices on the part of cheap jerry builders to avoid cost by cheating the inspectors, and if we overtax the force on which we depend for inspection, we are entirely adrift, and might as well have no law about it. The problem is only to be solved by keeping the drains *in sight*, or readily accessible, so that defects can be easily detected, whether in new or old work.

We firmly believe that until this is required we shall not cease to hear of the ground becoming defiled under dwellings by having continued drain leakage, for nothing is more certain in such matters than the old saying, "What is out of sight is out of mind."]

TREE PLANTING AND FOUNTAIN SOCIETY OF BROOKLYN.

We are pleased to note the revived activity of the Brooklyn Society for the encouragement of tree planting and the establishment of drinking fountains, and we gladly give space for the publication of the following address to the citizens, recently issued by the executive committee of the Society:

"This society, established for the purpose of promoting the planting and protection of trees in this city, presents the following suggestions to those who may feel disposed to lend their aid this season toward rendering the city more attractive, and at the same time adding to the comfort and pleasure of the people: In the first place, it is very desirable to secure concert of action. Instead of individual effort, it would be far better if the residents of a block should combine and employ a competent person to set out a certain number of trees. The effect would be that others on the same street would soon follow their example. At the outset the question of light and shade should be carefully considered, in order that houses should not be rendered damp, or the free circulation of air obstructed. In narrow streets but one side, perhaps, should be planted, as less exposed to the sun than the other, excepting the corners of streets, and the trees selected should be those of an upright growth and well proportioned.

"The space dug out should be at least three feet each way, one or more cart loads of the sand and other material used in making the sidewalk removed and its place supplied with good fresh soil. Trees selected should be those raised in the nursery and which have by occasional transplanting developed a compact mass of healthy roots. The stem should be smooth and straight, the bark unbruised, and the head evenly proportioned. The best success is usually had with trees from one and a half to two and a half inches in diameter. If some of the roots are broken in removal, pare the fractured ends smoothly with the knife, so that the wounds may be quickly healed; then replant the tree carefully, placing the earth about the small roots and with gentle pressure bringing it into firm contact with them, settling it occasionally and watering it according to the season. The box for protection should be lined, where likely to come in contact with the tree, with leather, wool, or some soft substance, and firmly secured at its base. Barking and rubbing must be avioded. The flagging should be cut away so as to leave a space of at least two feet square around the tree, the earth kept loose and frequently watered, and the tree properly trimmed.

"Location should govern to a great extent in the selection made. The American elm and oak and Oriental sycamore are broad spreading trees on avenues. Many select the silver maple on account of its rapid growth, but its branches are thin and easily broken. Sugar maple, scarlet maple, Norway maple, and several varities of elms are among the best for narrow streets, but the sugar maple is perhaps the best of all. It is a tractable tree, strong, shady, clean, of rapid growth, and generally symmetrical in shape. We shall at all times be pleased to impart any information we possess, and to coöperate with the public in rendering the city attractive. One drinking fountain, at least, should be furnished this spring, and we urge those who feel inclined to unite with us in this work to send their address to the treasurer, Gordon L. Ford, No. 97 Clark street. The annual dues are five dollars."

Mr. J. C. Parsons, chairman of the executive committee and author of the above circular, writes us as follows in regard to the urgency of establishing drinking fountains:

"In view of the action of Dr. Raymond, the Health Officer, with respect to closing up the pumps, the waters

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of which have been decided to be unfit for use and calculated to produce disease, it is of the utmost importance that drinking fountains should be erected in our streets. It is a question that certainly should interest every good citizen, as conducive to the health and comfort of the people and an offset to the spread of intemperance. People will get thirsty in hot weather; will drink; if water is not at hand, then something stronger. One fountain should be started this spring, but we must have members first, or some generous individual, contribute towards that object. No man can have a better monument, one that will keep his name fresh and green in the hearts of thousands who stop for a cup of cool water, and recall while drinking, the citizen to whose liberality and kind feeling they are under obligation."

THE SEWERAGE OF BINGHAMTON.

Mr. Rudolph Hering and Col. Geo. E. Waring, Jr., were employed to make reports on a sewerage scheme for Binghampton, in this State. Mr. Hering's recommendations were adopted, whereupon Col. Waring wrote a criticism on Mr. Hering's suggestions. To this criticism Mr. Hering has replied. In this controversy the advantages of the respective systems are discussed, and considerable of general interest to our readers is elicited. We have, therefore, in this issue devoted considerable space to Col. Waring's paper, and will give Mr. Hering's reply in our next issue.

To the Citizens' Committee, Binghamton, N. Y.:

GENTLEMEN:—Had Mr. Hering's report been published when I wrote my suggestions as to the sewerage of Binghamton, I should have commented, at that time, on some of his recommendations. It is right to do so now.

The difference between the system that he adopts and my own is much greater than would at first appear. Both are of the same class. One is the well known and long used "Separate System" of England; the other is a system of absolute separation with modifications designed to reduce the cost of construction and maintenance, to avoid obstructions, to preserve in the sewer a constant condition of cleanliness, and so to prevent the formation of "sewer gas."

The first use was made of these modifications in Memphis, where they have stood the test of three years' use in a trying climate, largely among a careless negro population, and generally under circumstances less favorable than those of Binghamton. Their application in Memphis has been on a very large scale—about twenty miles of sewers in 1880 and about forty miles in 1882. These sewers have been examined—to the degree of very close scrutiny—ever since their construction was begun, and by no means always with a desire to find them successful. So far as I know, no unfavorable report concerning them has ever been published. They have invariably been found and reported to be clean and entirely free from the odor of decomposition, to perform their duty in a satisfactory way, and to meet every requirement contemplated in their construction. There have been a few stoppages and these have been easily and cheaply removed.

In the winter of 1881–2, owing to an inordinate waste of water (to keep pipes from freezing) the main sewer was overcharged; but even if this had been due to a defect of the main—and it was not—it would not have been to the discredit of the system itself.

Since 1880 this system has been adopted for, and more or less completely constructed in, Little Rock, Ark., Omaha, Neb., Kalamazoo, Mich., Birmingham, Ala., Norfolk, Va., Wilkes-Barre, Pa., Pittsfield, Mass., and Keene, N. H. So far as I know, all reports from all of these places have been entirely favorable. In some of them the system is in full working; in others it is in course of construction.

Probably it was in part Mr. Hering's proper hesitation to recommend patented improvements, on which his clients would have to pay a royalty—a recommendation that should never be made lightly—that deterred him from following in this regard the suggestions of my earlier report to you.

He has adopted in his plan for Binghamton, and elsewhere, the separate system, as it is carried out in England. I think he has made a mistake.

The English separate system was introduced by Pilbrow, at Tottenham, about 1851. It has had some adherents ever since. For a long time it had very few among the better sewerage engineers. It is not a strictly *separate* system; that is, while it excludes street wash, it admits roof water and, generally, water from back yards. This for two reasons: First, to provide for the flushing of the sewers by storm water, which, in that country of frequent rains is, for a good part of the year, tolerably effective; and partly—and this is important—because, under the English law, a householder cannot be required to make two drains from his premises, nor can he be prevented from admitting roof and yard water to the drain that he does make.

Neither is there any absolute restriction as to the provision he must adopt to secure the exclusion of rubbish from his yard drain.

Therefore, the "Separate System" of England is a *restricted* rather than a separate system. In order to provide, so far as practicable, for the removal of materials admitted to drains from yards, it begins usually with a diameter of 9 inches, and it increases very rapidly in size up to 12 or 15 inches of pipe and larger sizes of brick sewers.

Latterly, the system has had considerable extension, in the case of towns which have been required by legal process to refrain from delivering their sewage into water courses until purified by irrigation or other process. Compliance with the requirement is made cheaper by this restricted system than by a full storm water system, because the amount of water to be handled in wet weather is much less than if the street wash were added.

While in London last Autumn, I had conversation with several engineers who have recently constructed works of this kind. Their tone was universally to the effect that it was a system which would *do*, and would generally do very well under circumstances where it was necessary. The number of those practicing it who gave me the idea that they would practice it in the absence of the legal requirements above referred to, was small.

The objections to the system, which have much greater force here than they have there, because of the much longer periods during which with us there is no rain, and because of our heavier rains, are as follows:

1. Owing to the great size necessary to give to the pipes, the flushing effect of the daily maximum flow is enormously reduced, so that, even with the short intervals of drought in England, deposits in the sewers are very common, and the rainflow is frequently only sufficient to wash together these deposits and the rubbish admitted into the court yards, forming actual stoppages. The need for constant watching and frequent removal of obstructions is very great, and has been cited in engineering discussions as a serious objection to the system.

2. Of course, the deposition of material between storms, if it lasts more than a day or so, becomes a source of great foulness, and the atmospheres of these sewers is worse than that of ordinary storm water sewers. One engineer, who has always been a champion of the separate system, showed me the drainage of a large private house and grounds in London, executed under his direction, and regarded by him as a model of excellence. It depended for its flushing on roof and yard water. It had rained within a week, yet on opening some of the well-ventilated manholes to examine the sewers, the air was found to be as foul as that of an ordinary house drain or cesspool.

3. The system is very costly. If rain-water is to be admitted even from the smallest surface that will give a flushing quantity during moderate rains, it is necessary to give the sewers a sufficient capacity to remove *all* the water that can fall on this surface during a sudden, heavy shower, when from 1 to 2 inches in depth over the whole surface must sometimes find its way to the sewers within an hour—occasionally within much less time. If the sewers are not of ample size, sewage sets back into house drains during such storms. It is this requirement for large diameters which makes the sewers so foul, as indicated above, and which makes them, in my judgment, quite inadmissible here, where there are often very long intervals between storms.

To give an idea of the cost of such work, I have had prepared an estimate of the sizes that would be needed for a sewer beginning 25 feet west of Third Avenue in New York City, and discharging into a sewer in Sixth Avenue, a distance of 2,985 feet; supposing it to have a fall of 1 to 200, draining every house on the way—the area being fully occupied and peopled—and receiving the rainfall from roofs and the paved portions of yards equal to a width of fifty feet on each side of the street. The calculation assumes a rainfall of one inch per hour, reaching the sewers at the time when they are carrying the maximum flow of house sewage. I give an estimate of the cost of the pipes required and the cost of laying the same, *not including trenching and back filling*, and not considering the extra cost of the wider trenches for the larger pipes, but including the cost of man-holes made necessary by the liability of such sewers to become obstructed, and offsetting these with the cost of a flush tank at the head of a single line of 6-inch sewers.

Beginning with 8-inch pipes, we should require the following lengths of different sizes:

8-inch	393 feet,	cost including laying	30½c.	per foot,		$119.87
10-inch	320 "	" "	"	46	"	147.20
12-inch	530 "	" "	"	53¼	"	282.22
*15-inch	1742 "	" "	"	82	"	1,428.44
Man-holes, 9 at $40,						360.00
						$2,337.73

If all the rainfall were excluded, and the sewer had to carry only the house drainage, but a liberal allowance of this, the whole line might be made with 6-inch pipes. Hand-holes and short lamp-holes could be substituted for man-holes, and a flush tank at the upper end of the line would clean the whole length at least once a day. Such a sewer, with its flush tank and all appurtenances, would not cost more than $900, excluding trenching and back filling, as in the other case, *but including royalty.*

It is proper to say that wherever the English separate system is carried out, provision is made for flushing through man-holes; but this requires personal attention, which is never reliable, while the opening of man-holes leading to small pipes is a frequent source of the admission of substances which cause obstructions. The total cost of flushing and cleansing cannot be arrived at with accuracy; but it is in all cases necessarily much greater than the cost of a supply of water to an automatic flush tank, and of the rare removal of obstructions—which must have passed through 4-inch house drains, and which are little liable to be arrested so as to form accumulations in well flushed 6-inch sewers.

The proportionate cost, as shown by this example, would hold good, with perhaps an addition of $100 for flush tanks where several branches would take the place of one straight line, in Binghamton or elsewhere.

It seems to me, therefore, that Mr. Hering, while he would save your city the payment of ten cents per foot royalty, and while he would shield himself from the charge of adopting a patent, would lead you to the payment of about 47 cents per foot in *additional cost*, and to the construction of a very crude, imperfect and unsatisfactory system of sewerage.

Mr. Hering, in his report, thus sets forth "the main principle to govern the design of your works:"

The conditions presented in the city of Binghamton are such, that while provision should be made for the reception of sewage on every street, the storm-water can to some extent flow away entirely on the surface. But there are localities where it also must be removed underground, and it then becomes a question whether it should be taken into the sewers or into separate channels.

In both cases the entrance of silt and gravel will have to be prevented as much as possible, particularly in sewers, as much of it would deposit and retain the foul matters also. Yet this care is almost as necessary for the channels carrying only the street water, as the rubbish, horse manure and filth washed into them sometimes makes them as foul as a sewer.

In general, the relative economy of the two methods for a particular district can be determined by the circumstance as to whether the removal of rain water will have to be practically as deep as that of the sewage. If this is the case, one channel for both purposes will be less expensive. Again, if a combined sewer requires but a little greater excavation than one for sewage alone, it will ordinarily also cost less than to build two separate sewers.

It has been the common custom, where separate systems were used, to admit everywhere with the sewage also at least some of the rain water from the roofs. And this has been done for the following reasons:

First.—While much of the water falling upon the gardens and streets is absorbed and evaporated, nearly all of the roof water flows off and reaches the streets. To lead it away under ground will therefore materially diminish the amount running through the yards and in the gutters. This relief to private premises, though not affecting the sanitary question, is usually considered very desirable. It is quite frequent that we find a sub-surface removal of rain water, where sewage removal is not yet thought of.

Second.—The entire exclusion of roof water from sewers necessitates the construction of two separate drains from the houses, if it is to be taken away underground. While this adds expense to the owners, it has also been found a source of annoyance by the maintaining of two pipes where one will do as well; not to speak of the possibility of workmen connecting with the wrong sewer,

*Theoretically the lower 700 feet of the sewer should be 16-inch and 17-inch diameter. The 15-inch will work under a head below this point.

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which has been not unfrequently found to occur even in England, where municipal work receives more care than here.

Third.—The admission of clean water from roofs is of great benefit to the sewers, as it gives a continuous flush at times of rain, washing them out more effectually than can be done by flush tanks alone, though these are excellent aids in dry weather,

Where it has been necessary to pump the sewage in order to finally dispose of it, the amount of roof water has been reduced and sometimes excluded entirely. But no such restriction is necessary in your case.

For these reasons I would recommend to you to have some of the roof water from every house led into all of the sewers. The slightly increased size of pipes for this purpose—there being no increase of excavation necessary—is repaid not only by a correspondingly less size of special rain water channels, and a reduction of the amount of water running through the yards and in the gutters in summer, and of less ice about them in winter, but also by a better cleansing of the main house pipes and sewers, which is a most essential consideration. After many years' experience in England, this practice is now advocated there by the best authorities.

With the outfalls at the mouth of the Chenango river, and the partial or entire storm water reception in the sewers advised, economical reasons now demand that, while the foul matter must be taken to the above outfalls, the storm water should be carried only to the nearest water course to save the building of large sewers where it is not at all necessary.

To accomplish this, it is customary to build intercepting sewers, which take the ordinary flow of sewage to the more distant outfall, and allow the water from heavy rains to escape directly into the rivers or creeks. Such escapes or overflows into the natural water courses, if properly located, have not been found in the least objectionable, and their use is extensive. It is true that the storm water is mixed with sewage, but the first gush of rain flushes most of the sewage in the pipes rapidly to the outfall, and the remainder is greatly diluted before any part of it ever flows into the river. The small amount of objectionable matter escaping in this way could itself not cause a nuisance, and still less when it is considered that during, or soon after storms, the creeks and rivers carry a largely increased amount of water, which would more readily wash any organic refuse away.

From the foregoing considerations there can be no doubt that it would be as unwise everywhere to totally separate the storm water from the sewage as it would be everywhere to receive *all* of the storm water in the sewers. The former plan would often complicate the arrangements, while the latter would cause unnecessary expense.

The storm water of Binghamton can not only "to some extent" but very generally flow away over the surface. There are comparatively minor areas where it may not do so, and from these areas it can generally be discharged through short lines of shallow conduits of little cost. These few channels will, of course, require due precaution and care to keep them clean, but the attention and labor required for this will be as nothing compared with what would be demanded by the proper supervision of the much more extended system of sewers receiving street wash, for which Mr. Hering would provide,

Practically, "two separate sewers" will nowhere be needed. The disposal of your surface water is such a simple problem that, in my judgment, the construction of "combined sewers" should not be thought of, even if combined sewers were as good on sanitary grounds as independent sewers, which they never are.

Mr. Hering says: "It has been the common custom where separate sewers were used to admit everywhere with the sewage also at least some of the rain-water from the roofs." I have cited above respectable instances well known in this country, where this is neither done nor needed. The "common custom" is the custom of England, where the separate system has never been made satisfactory to the majority of engineers and sanitarians.

Comparatively little of the roof water of Binghamton, except on the business streets, reaches the streets of all. Wherever it does or should do so, it should flow into the street gutters. If it were important "to lead it away underground" and "materially diminish the amount running through yards and in the gutters," it might be worth while to expend public money to secure this result; but is only important to prevent the flow of the gutters from accumulating to an inconvenient or injurious extent. It is only to prevent such accumulations that "sub-surface removal of rain water where sewage removal is not yet thought of" is properly resorted to.

"The entire exclusion of roof water from sewers" does *not* necessitate "the construction of two separate drains from houses if it is to be taken away underground;" it may necessitate its being carried by a covered drain across the sidewalk, and this may cause inconvenience at rare intervals in winter. "The possibility of workmen connecting with the wrong sewer, which has been not unfrequently found to occur even in England, where municipal work receives more care than here." is not an argument which should apply in the case of any community proposing to construct a new system of sewers. The tendency of all American practice is toward the immediate supervision of house connections by Boards of Health, and nothing is more easy than to secure a uniform compliance with the requirements that house drains shall connect with the foul water sewers. Furthermore, as, under any proper system in a place like Binghamton, there would be only one sewer in at least nine-tenths of the streets, this objection, if it existed anywhere, would not apply in this case.

"The admission of clean water from roofs" can be of benefit to the sewerage system only when the rain fall is large enough for *thorough* flushing. It is quite true that *heavy* storms under such circumstances, would give a continuous flush and wash them out more effectually than would flush tanks alone, *if these worked only at such intervals.* Many a light rain falling after there had been a couple of week's accumulation of filth in the sewers, would be as likely to wash this into masses and obstruct the sewers as to wash the sewers clean. Even if we admit the full benefit claim, what shall we say of the condition of such sewers depending on this means of flushing alone, when rain does not fall oftener than twice a week? And what when it does not rain at all for a month? The fact is, as proved by ample experience, that the daily or half-daily flushing of separate sewers with automatic flush tanks settles for good and all the whole question of deposits and of uncleanliness. Therefore the recommendation for the admission of roof water is, in my judgement, ill advised. The size of pipes required therefor would be by no means "slightly" increased, as the illustration already given clearly shows. For example, in my system, where great lengths of 6-inch sewers are used, the cost of the pipe and laying is not over 18 cents per foot. Mr. Hering begins with 8-inch pipes which cost, with the laying, 30½ cents per foot. The difference of cost of this size therefore is 25 per cent. greater than the royalty charged on my system, while he must soon run into larger sizes, increasing the cost enormously, as shown above. As "the special rain water channels" would usually be the street gutters, a slight increase in their size would not be material. Minor house pipes and house connecting drains are pretty efficiently flushed by any of the modern (and only acceptable) forms of water closets, so that "this most essential consideration" satisfies itself. As stated above, "this practice is now advocated" in England only because under English law there is no alternative.

Under the plan that I recommended there would be saved the large sum required for Mr. Hering's intercepting sewers with properly arranged overflow discharges into the rivers or creeks. Unless the intercepting sewers were made very large and very costly, as compared with the necessary cost of the general sewerage work, even light storms, which would not at all affect the flow of the river, as local storms very often do not, the amount of filth delivered into the river *would* be seriously objectionable.

The generalization with which Mr. Hering concludes his recommendation has, I think, no proper application in this discussion as applied to towns like Binghamton. If by "the former plan," he means my plan, there would be no such complication as he refers to.

If Memphis has proved anything, it has proved that man-holes and lamp-holes for the inspection of the interior condition of the sewers are not necessary, and if the custom of American city engineers is to be taken as a guide, such man-holes and lamp-holes are not used for this purpose after they are built. I dissent entirely from the opinion as to the relative advantages of making turns with short curves in man-holes and making them with long curves in the line of the sewer.

"English experience of many years has shown that six-inch pipes, although theoretically large enough, are comparatively much more liable to stoppage from obstruction, which even regular flushing could not prevent, and many have been replaced by larger sizes," because of the absence there of authority to prescribe the exclusion of surface water and its rubbish from the sewers. I have shown by nearly five years' experience in Cumberland Mills (Maine), and by more than three years' experience in Memphis and shorter experience elsewhere, that with perfectly feasible regulations, 4-inch pipes are ample for all house drains, and that we can safely adopt this size, which will, of course, keep itself much cleaner than would drains of six inches or more. Mr. Hering says: "The advantages of taking away roof water in the sewers by obtaining an occasional heavy flushing, by relieving private premises of much of the rain water, and also by reducing the quantity washing down the streets, all fully justify its underground removal as one of the main objects of building sewers." I submit to the consideration of anyone familiar with the soil and arrangement of buildings in Binghamton, that if the flushing of the sewers can be more perfectly accomplished by cheaper means (as it can by automatic flush tanks), there is nothing in the above suggestions which would at all justify the doubling of the cost of the work needed to relieve the city of its impurities.

He also says: "Experience with the sewers will soon tell how often an inspection of the different sewers is necessary to avoid serious accumulations." Experience with the forty miles of sewers in Memphis shows that with sewers arranged as they are there, such an inspection is never necessary, obstructions being so rare that the cost of their location and removal is less than would be the cost of even a monthly inspection of the whole system by man-holes and lamp-holes; which, as I have already said, would not be used if they were built.

It is quite true that "catch basins should be regularly cleaned after every rain;" it is also true that they never are so cleaned and that they are apt to constitute an intollerable nuisance in paved streets from which much horse manure and other filth is deposited in them.

It is recommended to ventilate the sewers "by giving access to the outer air at all manholes;" also, as these man-holes' openings are subject to obstruction, "to ventilate sewers through private house pipes which are extended beyond the roof." Wherever this latter has been adopted, the ventilation is complete without reference to man-holes. Where man-holes have been relied on without ventilation through house drains, they have never been effective in connection with pipe sewers.

The foregoing criticism is sustained by the distinctly expressed opinions of prominent leaders of the modern movement to improve the conditions of public health—opinions based not on the engineering customs of any country, but on a careful study of the merits and defects of public and private drainage works, in England and elsewhere. The introduction of the English separate system marked a great and most beneficent advance on the processes prevailing thirty years ago. It has not been changed in principle or in arrangement from that day to this. As Chadwick and Rawlinson and Pilbrow started it, so their followers have kept it going ever since.

Within these thirty years our knowledge of all sanitary branches of engineering has widened vastly—one thing that it has compassed has been a radical and much needed remodeling of the "separate" system of sewerage. This improvement is not only correct in theory, but it has been proven and approved by extensive practice, and found to offer an easy, safe and economical solution of difficult problems in town sewerage which previously existing systems do not meet.

To disregard this development and go back to the infancy of sanitary engineering for a more costly and more crude process would seem a curious course for a modern American community to adopt.

GEORGE E. WARING, JR.

NEWPORT, R. I., *Feb.* 1, 1883.

Dr. D. F. Lincoln, in a paper read before the Social Science Association, of Philadelphia, the 25th ult. on "School Hygiene," said that "The best system of ventilation would be by a steam fan. A good device is the shaft or draught chimney, which is kept 'drawing' by the iron smoke flue from the heater which passes up through it. But this system is unreliable in mild weather. For small rooms with stoves it is feasible to have each stove boxed around with an iron screen, with an inlet to throw fresh air into this box, which passes through holes into the room when warmed as the hot air from a furnace does.

"A large amount of air for each pupil does not necessarily imply good air in the absence of proper means for replenishing the supply. Early habits of reading and writing should be formed very carefully. Seats ought to be chosen so as to avoid uncomfortable and awkward positions. Excessively fine maps and fine map drawings are prejudicial, and the position of windows and quantity of light supplied are of the greatest importance to prevent injury to the eyesight of the pupils."

H1 J9

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Correspondence.

PLUMBERS' PROFITS.

CHICAGO, *April* 11, 1883.

To the Editor of THE SANITARY ENGINEER:

I was well pleased to read your able and manly editorial on "Plumbers' Profits."

Plumbers' profits! What are they? I have been searching for them the last seventeen years. Occasionally I have been taken by the hand and thanked for the quality of my work; in one case I was told I had added ten years to a man's life; in others the children have recovered from their fevers and the credit has been given to me. But the dollar and cent rewards have not yet come, nor will they come until the plumber educates the public to the fact that a good workman is as much entitled to a fair competency as any other business or professional man. In order to have our work well executed, we are forced to pay from $4 to $4.50 per day to a plumber, and $1 per day to a helper. If we charge $6 per day for these services, we are expected to pay out of the difference 75 or 50 cents, rent of store, necessary clerk hire, horse and wagon, taxes, wear and tear, etc. For ourselves, we are expected to live upon air and water, clothe ourselves with the leaves of the forest and die contented. Again, many of us have been reared in the lap of poverty, and gained our education as street Arabs, but we are expected to combine the knowledge of a chemist, the art of an architect, the skill of a mechanic and the morals of a Washington.

Commercial society recognizes the divisions of *merchants, the manufacturer*, whose province is to learn the wants of society, to supply these wants in a cheap and elegant manner consistent with their durability and utility, through the *the wholesale men*, and these to the community through *the retail merchant*.

Each of these divisions is necessary for the economical distribution of merchandise. For instance, the *retailer* in one locality learns all the details essential to the purchasing, display, and selling of the different line of goods in his vicinity, and another the desires of his customers in another locality. The wholesale men are thus posted by each of these retail men as to the demands of different localities, and can readily provide for them all. In fact, each retail man is the agent of consumer and wholesale men, and is entitled to a fair commission for his services. In the end the consumer is the one who profits by it. The writer would say, let manufacturers make the goods and only sell to wholesale men, and these in turn only to the retail merchant, the retailers to purchase only of the wholesale men who confine themselves to the wholesale trade. If the man who purchases his own material and hires an inexperienced though cheap man to fit it up, compares the price at which a responsible firm would have contracted to do the whole work, he will find "that he has paid too much for his whistle." The day has come when each division of commercial society must be up and doing for its own protection, must organize and defend their rights in a reasonable but firm manner; and I know of no better way for the plumbers than organization in every State, and each State to be represented in a national convention. In this manner it will tell to the profit of all concerned.

In conclusion, I will say, THE SANITARY ENGINEER is to be commended for the fair and unbiased stand it has taken on this subject; being the recognized authority on subjects pertaining to sanitation in its broadest sense, what it has to say will be well considered by society.

I hope I have not made this too long.

I remain yours, etc.,

"HELPER."

[The writer of this letter is a prominent Chicago plumber, and an active member of the Master Plumbers' Association of that city.—ED. SAN. ENG.]

STAUNTON, VA., *April* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

I have just read your articles on "Plumbers' Profits," also the letter from Worcester. This city has a population of seven thousand. There are three regular plumbing establishments, and there are four walking plumbers—that is, plumbers who get the owners and often the contractors to buy materials, and they do the work by the day. Besides, there are three hardware establishments here, and whenever drummers from plumbers' supplies houses come to this little town, they sell them goods as low as they will sell to plumbers; not only that, but they will sell a few hundred feet of pipe or a single valve to any farmer as low as they will sell 10,000 feet of pipe or a gross of valves to us plumbers.

These are facts, and I can, and will, if required, give the names of the sellers and the buyers. We all know if the manufacturers and dealers would protect us, we could get better prices, and could afford to pay better prices. I am sure, if your valuable paper will keep this question before the trade for a while, something will be done. I am afraid if we were not to buy from any but those who would not sell to consumers, we would have to close our business, for nearly all do it, but claim they have to sell to consumers because others do it.

Respectfully, etc., C. BARGAMIN.

CHICAGO, *April* 8, 1883.

To the Editor of THE SANITARY ENGINEER:

Your article on Plumbers' Profits, in your last issue, deserves commendation from the lips and pen of every employing plumber in the land.

I have known something of plumbers in this city since 1854, and I do not know of a single one who has amassed a competence, while men in other trades in the same time have become wealthy. When such papers as THE SANITARY ENGINEER are with us the battle is already won.

Respectfully yours, A. YOUNG.

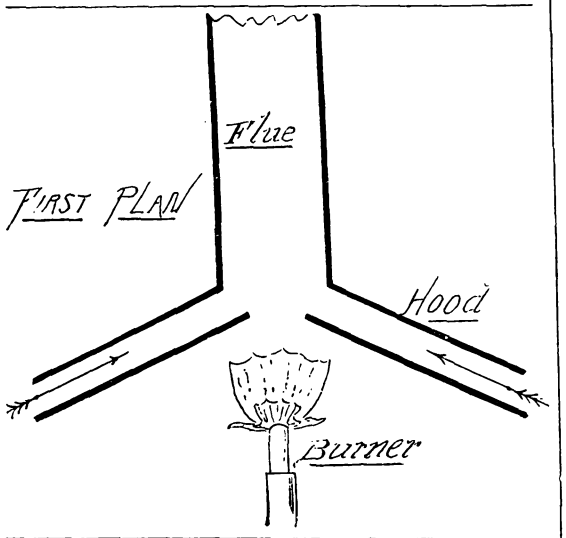
PRODUCING DRAFT IN VENTILATING PIPE BY MEANS OF GAS JET.

BOSTON, *April* 7, 1883.

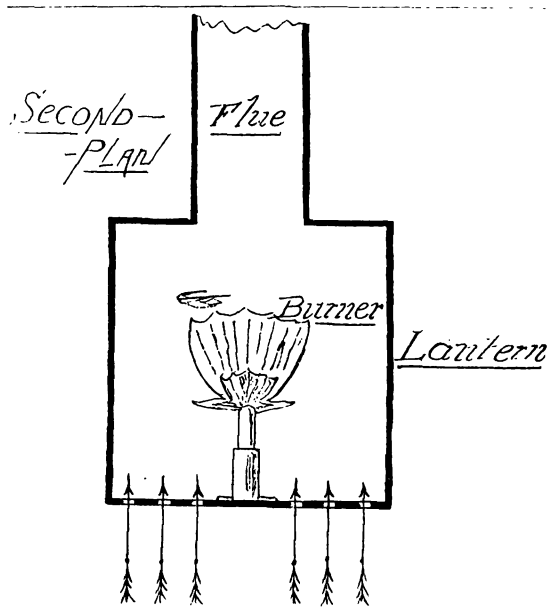
To the Editor of THE SANITARY ENGINEER:

I wish to produce a draft in a ventilating flue by using a gas jet for that purpose. Two arrangements of the jet have been suggested. One is about as follows:

The gas jet is set under a flat metallic hood, made double, as shown in the sketch, it being intended that the jet shall heat the metal of the lowest hood, which will in its turn



heat the air which passes in between the two hoods, or parts of the hood, as indicated by the arrows. The other is to simply inclose the jet in a small chamber or lantern in the flue, as is the very common practice. I am told I will produce a stronger current by the first method, because I heat a large surface, which in its turn heats a large stratum of air, while with the lantern I only heat a small surface of air as it comes in contact with the flame. Never-



theless, I prefer the second, because I think I can heat air better by *bringing it directly into contact with the flame*, than if I used the flame to heat a metal surface first. Indeed the idea first suggested seems to me like inventing ficticious heat to make up for the loss which always occurs in heating the metal surfaces. H. D.

[We believe the best results will be secured by the latter plan, since less of the heat is lost by radiation into the room.]

NEW METHOD OF DETECTING WELL POLLUTION.

ELMIRA, N. Y., *April* 3, 1883.

To the Editor of THE SANITARY ENGINEER:

Some years ago two neighbors of mine had a law suit about a privy. Their premises were next to each other, and it is presumed one built his privy close to the other's fence and house, when he could have taken a middle course and placed it three times as far from the well.

On the suit, a physician of considerable standing testified he considered the privy sufficiently far from the well not to pollute it. On a bare assumption, and because he was a doctor, the jury assumed "he knew."

I now wish to tell you my own experience in the same neighborhood. After reading a few copies of your paper, which came into my possession, I began to talk the question of cesspools, privy vaults and wells with my wife, advising her to boil all the water before drinking, which she would do sometimes and sometimes forget. In fact, it was not practicable anyway, as the children would take cups and go to the pump, but withal, we lived on in that house until one day my wife cut my oldest boy's hair, which is a *beautiful auburn*, but contrary to the usual method of burning the *débris*, she threw it into the cesspool, and the result was, *short red hair in the well water*, of such an unmistakable hue that my wife pronounced it Jack's. I moved. Yours, etc., K.

HEATING A BATHING POOL.

TOPEKA, KAN., *March* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you please inform me, in the next edition of your paper, how I can heat a bathing pool, 84 feet long, containing about 72,000 gallons of water, the size of pipe that would be necessary, and how long you think it would take to heat? also the size of boiler necessary? By so doing you will oblige, A. ANDERSON.

159 Kansas avenue.

[If you wish to warm 72,000 gallons of water, say from 30° to 70° Fahr., it will take the heat of about 2,160 lbs. of steam to do it.

If you wish to do it in an hour from the time steam is turned on, it will be necessary that the boiler should have a heating surface of not less than 800 sq. ft.

If noise is no object when warming the water, a 4-inch steam pipe leading to a 4-inch header, from which about 30 lengths of 1-inch pipe may be run, open at the free ends, but reduced to the size of about a ¼ pipe.

A more expensive apparatus which may be made noiseless, is a somewhat similar coil of 1¼-inch pipe, but closed; the condensed water being pumped back to the boiler, instead of being allowed to mix with the water in the pool, as in the first method. The surface for this coil will have to be a matter of experiment.

At the New York Natatorium, 5th ave. and 45th street, the water is warmed by being circulated directly through the boiler, as in a hot water apparatus, and is the system we would recommend, a boiler of about 300 feet of surface being sufficient, on the assumption the time for first heating the water is no object, say, 3 to 5 hours; after which a slow fire can be made so as to maintain the temperature required.

Of course where the water from the boiler is discharged into the pool, care must be taken that hot current cannot scald anyone; a crib or some such arrangement being required.]

DRAFT IN DOWN SMOKE PIPE.

PHILADELPHIA, *April* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

I recently placed in my residence a fire-place heater, and from it conducted a 6-inch sheet-iron smoke pipe down through the floor and through the cellar to the furnace chimney. The vertical portion of the pipe extended downward 4 feet, and the horizontal portion through the cellar 19 feet, with three one-fourth bends in the cellar and a rise of two inches towards the chimney.

On first lighting the heater, and while there was a fire in the furnace, it burned nicely, but the smoke pipe was nearly cold the entire length.

After abandoning the furnace, and the chimney being cool, I again built a fire in the fire-place heater with hot coal and charcoal; it burned very slowly for three or four hours, then gradually changed for the worse, and died in about nine hours. During most of the time the room was filled with gas.

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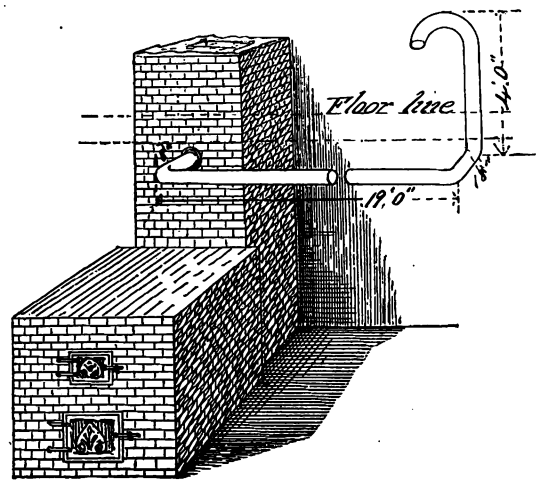
Now, Mr. Editor, I desire to know the best plan for overcoming this difficulty, and still use the down draft when there is no fire in the furnace. As the cellar is cold most of the time, and the pipe runs near the windows, would it not be better to use some other material for smoke pipe—say terra cotta—and cover it with a non-conductor? I think the air in the cellar chills the pipe, thereby cutting off the draft.

Your views on this will greatly oblige

INFORMATION.

[There is always difficulty in starting a fire with a down pipe entering a cold chimney, and unless the escape heat from the fire is sufficient to always maintain a column of air within the chimney lighter than in the down pipe, there will be no upward draft.

The probability is that the furnace chimney is of such a size (too large) that all the escape heat from the fire-place

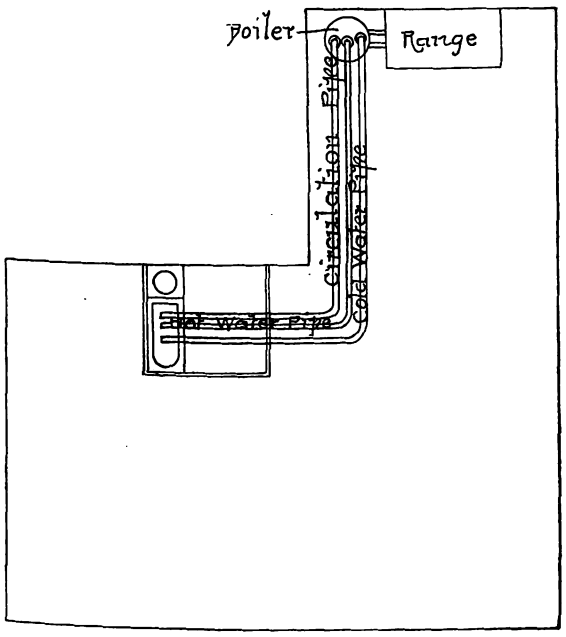


heater is not sufficient to maintain the required heat within it.

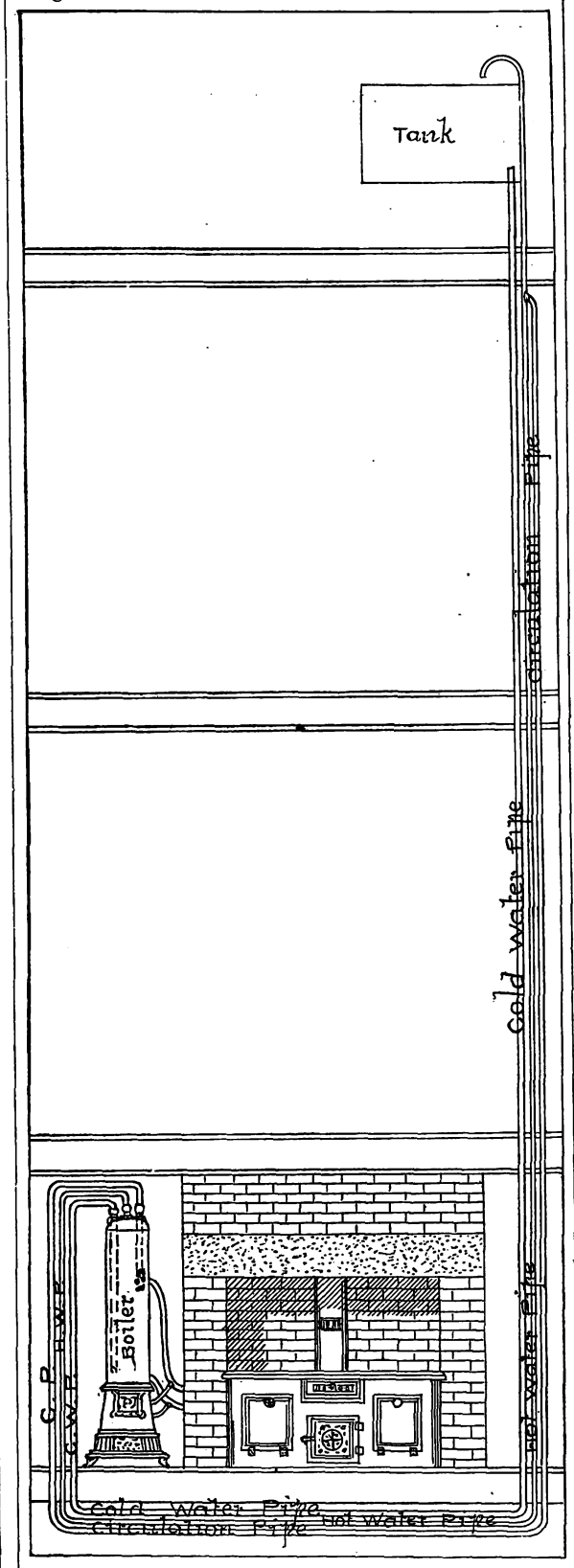
Your idea of preventing a loss of heat in the cellar is theoretically a move in the right direction, but we do not think it will do unless the pipe enters a small, smooth, straight chimney of good height, and then it will be better to cover the sheet-iron pipe with some good steam pipe covering which will stand fire, as it can be more readily supported than terra cotta.]

CIRCULATION BELOW THE BOILER.

Mr. J. T. Armstrong, of Keene, N. H., gives us a description of the manner in which he connected a 100-gallon galvanized boiler, in the Young Ladies' Seminary at Northfield, Mass., where it was necessary to have quite a trap in all three pipes—supply, hot water and circulation. The boiler sits on a small auxiliary heater, and is connected both with that and with the range. It stands in an ell, as shown on plan, while the plumbing fixtures are in a shaft in the main building. The tank stands directly over



this shaft, in fourth story, as seen in the elevation. The supply comes down to under floor of main building, and runs under floor of that building and of the ell, then rises to boiler, which has three couplings on top. The hot water drops immediately from boiler below the floor and after running under ell and main building, ascends the shaft, supplying fixtures on the way, to above bath and slop sink on third floor. Just above the highest faucets the circulation pipe is branched off, and from the junction an expansion pipe, ½-inch, goes above tank. The circulation pipe comes down beside the other two, to under the floor, and rises to coupling on top of boiler, descending into the boiler to about the level of the side coupling to range. Under these conditions, we are informed, the circulation is so good that very hot water is obtained as soon as even the farthest faucet is opened. The fall of the pipes from top of boiler to under side of floor is about 8½ feet; height to where circulation branches, about 30 feet. Hot



water and circulation pipes are ¾-inch lead, 3½ pounds to the foot; the fixtures supplied with hot water are 12 wash trays, three wash basins, three bath tubs, three slop sinks, three china sinks, and one kitchen sink.

HOT WATER RADIATOR.

UTICA, *April* 9, 1883.

To the Editor of THE SANITARY ENGINEER:

In your issue of April 5th, page 415, Mr. J. A. Fish, of St. John, N. B., wants to know of a hot water radiator for use in private dwellings, in place of box coil. In answer I would say I have put in several of the Whittier Radiators. They are well adapted for water circulation to be placed in rooms for direct heating. They are manufactured by the H. B. Smith Company, Westfield, Mass.

Respectfully yours, E. W. STRADLING.

NOTES FROM CINCINNATI.

(From our Special Correspondent.)

CINCINNATI, *April* 12, 1883.

Among the important structures, for the erection of which this summer preparation is being made, is the new Art Museum. It is to be of the Florentine Romanesque style and constructed of limestone, rock faced. It will be 105 feet wide by 210 feet long. Located in Eden Park, upon one of the highest and most picturesque knolls, its natural sanitary advantages are great, being quite above the smoke and vapors of the city. Although the plans have not advanced through all the minutes of sanitary appliances, the mode of ventilation has been decided upon, that is by means of an air well. Were it not that one or two in connection with private dwellings save it from being altogether new, it would be a novelty in Cincinnati. It is to be about sixteen feet in diameter and stand fifteen feet above ground, and at some distance from the building. The trench connecting it with the basement of the building will be twelve by seven feet. The steam coils will be enclosed in chambers thus supplied with fresh air, which from these will be conducted to the various apartments. It will be, so far as as your correspondent can learn, the only public building thus supplied. In its architecture and sanitary appliances our Art Museum is expected to be be a model of high art, and may form the subject of a future letter.

To many other of our buildings it will doubtless afford a wonderful contrast—our "city buildings" for instance. This, with its central station-house, is a positive disgrace, and this is affirmed with a careful avoidance of exaggeration. The plumbing is execrable and of the crudest kind. Off the main lower hall is a water closet, the stench from which pervades the whole building. A keen sense of smell is enabled to detect its ammonia in nearly every quarter of the building. In a room, say, thirty by thirty feet, full of iron cages, are confined the criminals of all grades. The ceiling is just a little way above a tall man's head; imagine this room, with from thirty to sixty persons confined in it over night. A close basement, contiguous, uncleanly water closets pour into it continually their gaseous stench, and the rank air, exhausted of its oxygen, is sickening and oppressive to one entering from the outside. A closed stairway leads up from this pen into the court room. Usually about twenty-five prisoners are brought up at a time, and the vapors which they bring with them are ordinarilly sufficient to poison the atmosphere of the court-room. Time and again your correspondent has seen sensitive persons resort to their handkerchiefs, the lawyers hitch their chairs over to remote corners, and the persecuted reporters unceremoniously take hold of their noses. Save that the city hospital, by virtue of its roomy and spacious construction, may be said to be very well ventilated, there is, perhaps, not a public edifice but is sadly in need of ventilation.

Small-pox has disappeared from Ciucinnati.

Since the flood the sanitary department has been devoting its entire energy to the pumping out and cleaning of flooded cellars, and the work still goes on. The department furnishes pumps and the owners or occupants are required to do the work. The inspection of such a vast number of cellars has let in a flood of light upon what is, undoubtedly, a great source of disease. They have such cellars under hundreds of buildings chiefly occupied below as business houses, which have evidently never been cleaned out since they were constructed, which may be any time from ten years to a quarter of a century, or over. The conclusion seems to be arrived at, that throughout the business districts everywhere, and especially, for several blocks deep along the river front, and in Mill creek bottom, the actually clean cellars are but a small proportion of the whole. As affording an opportunity to compel the cleaning out of cellars, the flood is regarded by the sanitary officers as a blessing in disguise. Some portions of the city, however, are in a bad way, notably the suburb of Cummingsville. It is without drainage, and the soil retains the water like a sponge. So soon as the engines pump out the water, they fill up again, and it will be far into summer before the natural drainage will render the soil normal.

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REPORT ON FOOD ADULTERATION AND ILLUMINATING OILS.

The following is the conclusion of the report of Dr. C. F. Chandler, of the Sanitary Committee of the State Board of Health, for 1882. The first part, concerning illuminating oils, was published in our last issue.

II.—FOOD AND DRUGS.

The following work has been accomplished under Chap. 407 of 1881: 194 samples of food had been purchased. Of these 119 have been examined by the public analysts, 50 of which were found to be adulterated, while 69 were pure; 92 samples of drugs have been purchased, of which 75 were analyzed; 32 were found to be adulterated and 43 pure. Tables V. and VI. exhibit the details with regard to these samples.

SAMPLES OF FOODS PURCHASED IN 1882.

Article.	Pure.	Adulterated.	Total Analy'd	Not Reported.	Total Purch'd
Allspice	2	3	5	15	20
Arrowroot	1	....	1	....	1
Baking Powder	1	..	1	5	6
" Soda	20	1	21	1	22
Butter	1	....	1	4	5
Catsup	1	....	1	....	1
Candy	1	...	1	...	1
Chicory Extract	..	...	....	1	1
Coffee "	...	2	2	3	5
Coffee	14	4	18	....	18
Cinnamon	3	4	7	8	15
Cream of Tartar	6	22	28	5	33
Cloves	2	4	6	10	16
Flour	3	..	3	....	3
Ginger	2	.	2	3	5
Isinglass	1	....	1	....	1
Kaoka	....	....	....	1	1
Mustard	....	6	6	1	7
Mace	....	..	....	1	1
Pepper	4	4	8	15	23
Saleratus	2	....	2	....	2
Sugar	1	....	1	....	1
Tea	....	....	....	2	2
Vinegar Pickles	4	....	4	...	4
Totals	69	50	119	75	194

SAMPLES OF DRUGS PURCHASED IN 1882.

Article.	Pure.	Adulterated.	Total Analy'd	Not Reported.	Total Purch'd
Arrowroot	2	2	4	....	4
Bismuth Subnitrate	1	....	1	....	1
Cocoa Butter	2	2	4	....	4
Cream of Tartar	7	....	7	...	7
Ipecac Root	3	4	7	....	7
Jalap	3	1	4	2	6
Magnesia, Citrate of	....	1	1	...	1
Mustard	2	4	6	....	6
Orris Root	3	2	5	....	5
Opium	1	....	1	....	1
Quinine Sulphate	3	1	4	....	4
Rhubarb	5	4	9	2	11
Sarsaparilla Root	1	....	1	1	2
Saffron, Spanish	4	3	7	3	10
Sulphur, Precip	6	7	13	....	13
Tartaric Acid	....	...	....	9	9
Wax, White	....	1	1	....	1
Totals	43	32	75	17	92

Samples of food and drugs have been purchased in nine different towns and cities of the State, as shown by Table VII:

FOOD AND DRUGS PURCHASED IN 1882,

Name of City or Town.	Samples Food.	Samples Drugs.	Total Purchased.
New York	87	50	137
Brooklyn	....	23	23
Albany	9	....	9
Utica	16	6	22
Syracuse	28	5	33
Geddes	6	....	6
Batavia	1	...	1
Buffalo	35	5	40
Niagara Falls	12	3	15
Total	194	92	286

Table VIII. exhibits the amount of work accomplished by each of the Public Analysts:

SAMPLES OF FOOD AND DRUGS REFERRED TO THE PUBLIC ANALYSTS IN 1882.

Analyst.	Foods.		Drugs.		Totals.
	Rept'd.	Not Rept'd.	Rept'd.	Not Rept'd.	
E. G. Love	59	28	....	9	Reported...59; Not rept'd .37
F. Hoffman	....	...	63	1	Reported...63; Not rept'd . 1
S. A. Lattimore	10	38	....	8	Reported...10; Not rept'd .46
W. G. Tucker	49	10	11	....	Reported...60; Not rept'd .10
Total	118	76	74	18	286
	194		92		

The Committee further reports that 24 cases have been prepared for prosecution. Complaints have been made, and the sellers of adulterated articles have been arrested and held for trial; 17 persons for selling adulterated cream of tartar, the percentage of adulteration varying from 37 to 95, consisting in all cases of gypsum; 2 cases of adulterated coffee; 4 cases of adulterated mustard. Table IX. exhibits the details of these cases:

PROSECUTIONS INSTITUTED IN NEW YORK CITY IN 1882 FOR VIOLATIONS OF THE LAW FORBIDDING ADULTERATIONS.

CREAM OF TARTAR.

Sample No.	Name of Retail Grocer.	Address	Date Purchased 1882.	Samples Purchased by	Defendant brought before Police Court.	Analyst's Report.
					1882	
6001	Peter H. Peterson	765 Second ave.	July 18	E. G. Love.	Dec. 8	37% Gypsum.
6004	Henry Fulle	823 " "	"	"	" 8	92% " remainder tartaric acid. Tried and convicted in C'rt. of Sp. Sessions Jan. 8 and 9.
6002	Simon Steiermann	926 " "	"	"	" 11	92% Gypsum, remainder tartaric acid.
6005	Martin Lahm	922 " "	"	"	" 11	70% " also tartaric acid and starch.
6009	Henry Schlichting	141 Mott street.	"	"	" 30	95% " remainder tartaric acid.
6019	John Bade	124 Canal street.	Aug. 3.	Fred. Kolbeck.	" 12	90% " with tartaric acid and starch.
6021	Ernest Spanhoff	19 Bayard street.	"	"	" 12	65% " " " " "
6022	John H.W. Doscher	324 Broome street.	"	"	" 14	85% " also tartaric acid.
6023	Adolph Maul	21 Mott street.	"	"	" 30	90% " " " " a little starch.
147	Henry Seekamp	982 Second ave.	Sept. 28.	A. L. Colby.	" 8	85% " " corn starch and tartaric acid.
148	Simon Steiermann	926 " "	"	"	" 11	92% " " tartaric acid.
149	Henry Goldberger	983 " "	"	"	" 11	85% " " corn starch and tartaric acid.
151	Martin Lahm	922 " "	"	"	" 11	70% " " " " " "
152	Charles Sinnigen	1002 " "	"	"	" 11	40% "
181	Matthew Kelly	851 Tenth "	Oct. 5.	"	" 8	58% " also flour and tartaric acid.
184	Frederich Diedrich	499 West 57th street.	"	"	" 8	91% " " tartaric acid.
182	Diedrich F. Deike	881 Tenth ave.	"	"	Sick.	92% " " " "

COFFEE.

Sample No.	Name of Retail Dealer.	Address.	Date Purchased 1882.	Samples Purchased by	Defendant brought before Police Court.	Analyst's Report.
					1882	
198	John O'Connor	838 Tenth ave.	Oct. 5	A. L. Colby.	Dec. 18	About 15% of chicory.
176	George Bain	981 Second ave.	Sept. 28	"	" 29	Burnt peas and about 10% of chicory.

MUSTARD.

168	Simon Steiermann	926 Second ave.	Sept. 28	A. L. Colby.	Dec. 18	40% wheat flour.
169	Anna Wedekind	1014 " "	"	"	" 29	40% " "
170	Charles Sinnigen	1002 " "	"	"	" 18	53% " "
196	Philip Greifenstein	833 Tenth ave.	Oct. 5.	"	" 18	71% " "

PRECIPITATED SULPHUR.

254	George Cutts	508 Third ave.	Dec. 16	A. L. Colby.	Dec. 30	30% su'phate of lime.

One of the defendants, Henry Fulle, was brought to trial before the Court of Special Sessions, on January 8 and 9. The case was vigorously defended, it is understood, at the expense of the wholesale dealers. The retail dealers have generally stated to the representatives of the Board, that it is not their intention to contest the law, that they regard it as for their benefit. The opposition appears to come entirely from the manufacturers and wholesale dealers in adulterated articles. The Court convicted the defendant and imposed a nominal fine of ten dollars, this being the first offence. The case is to be appealed at once.

III.—MILK.

The perishable character of milk makes it necessary that the enforcement of the law against its adulteration should be undertaken by the local boards of health. With a view to calling attention to the importance of this subject, resolutions were adopted at the November meeting of the Board:

(The resolutions have already appeared in our columns).

IV.—WATER.

The Sanitary Committee also reported that during the the past year 10 samples of drinking water have been examined by the Public Analyst, at the request of the local authorities, most of which have been found to be unwholesome. Table X. exhibits this work:

(The length of this table prevents our reprinting it here).

V.—DISTRICTING OF THE STATE.

For the convenience of the Public Analysts, the State has been divided into three districts, as follows:

I.—Southern District: embracing Sullivan, Ulster and Dutchess Counties, and all of the State south of them. The Public Analysts for this, the most populous district, are E. G. Love, Ph.D. and F. Hoffmann, Ph.D., both of New York city.

II.—Northeastern District: embracing Columbia, Greene, Delaware, Broome, Cortland, Madison, Oneida, Lewis and Jefferson Counties, and all that portion of the State north and east of them. The Public Analyst for this district is Willis G. Tucker, Ph.D., of Albany.

III.—Western District: embracing Tioga, Tompkins, Cayuga, Onondaga and Oswego counties, and all that portion of the State west of them. The Public Analyst for this district is S. A. Lattimore, Ph.D., of Rochester.

VI.—CONCLUSION.

In carrying out the provisions of Chapter 407 of 1881 and Chapter 292 of 1882, the Committee finds itself very much embarrassed from want of inspectors. There is only one inspector, A. L. Colby, Ph.B., of New York, for the entire State. His duty involves the purchase of samples of food and drugs and oil, investigating kerosene accidents, making inspections of oil refineries and other manufacturing establishments at Hunters Point, and responding to general calls made upon him by the Sanitary Committee or by the Secretary of the Board. In addition to to this, a considerable amount of time is involved in preparing cases for trial, and in attending Court. With the present litigation in progress in New York City, it seems important that at least an additional inspector be appointed for the other portions of the State. It is desirable that the person purchasing the samples be competent to test them, in order that in making complaint, he can testify, not only to the fact of the purchase, but also to the fact of the adulteration, and thus avoid the necessity of calling Public Analysts from a distance to attend a preliminary hearing.

All of which is respectfully submitted.

C. F. CHANDLER,
Chairman Sanitary Committee.

COUNTRY HOUSES.

We understand that the drains at Wynnstay, the well-known seat of Sir Watkin Wynne, are to be thoroughly overhauled. There seems reason to suppose that the attack of diptheria, to which Miss Necta Williams Wynne, Sir Watkin's youngest daughter, recently fell a victim, was the result of a bad sanitary condition of the house, and that Sir Watkin's own serious and prostrate illness during the winter was partly, at any rate, due to the same cause. This seems to be another instance of the truth of our recent remarks on the sanitary country houses, which we believe, as a rule, to be thoroughly bad. Wynnstay is a comparatively new house, having been erected after the fire in 1858, which destroyed the old mansion.—*Builder.*

GERMAN SANITARY CONGRESS.

The German Society for the Promotion of Public Health will assemble at Berlin from the 16th to the 19th of May. The principal address will be delivered by Prof. Virchow, his subject being, "What Use should be made of the Sewage or Refuse of Cities?" Immediately after the discussion on this paper, the members of the Congress will proceed in a body to visit the estates on which the sewage of Berlin is employed. Another question which will be dealt with by the Congress is the quality of drinking water and water used for domestic purposes, and how to test scientifically whether it is wholesome or deleterious to health.

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THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

The fifth annual meeting of the Sanitary Council of the Mississippi Valley took place at Jackson, Mississippi, April 3 and 4. Representatives were present as follows:

Arkansas.—Dr. J. A. Debrel, Secretary State Board of Health.

Illinois.—Drs. B. M. Griffith, J. L. Mellion, Jas. G. Keernan, W. A. Harkins, P. A. Barton, A. Schlernitzaner, members State Board of Health; J. M. Hall, Chicago Health Board; W. H. Doak, Wabash Valley Association.

Indiana.—Dr. H. G. Jones, State Board of Health.

Iowa.—Dr. W. H. Dickinson, State Board of Health.

Louisiana.—Messrs. Adolph Schrieber, Jno. Chaffe, Cotton Exchange; Geo. Purves, Lumber Exchange; T. H. Ryan and Wm. Traynor, City Council; Wm. Smallwood, Produce Exchange; Dr. Wm. Austin, Orleans Parish Medical Society, Ocean Springs and Biloxi, Miss.; Dr. J. M. Watkins, Medical and Surgical Association; W. B. Schmidt, Auxiliary Sanitary Association of New Orleans and Ocean Springs; Drs. W. P. Holliday, Edward Fenner, L. F. Salomon, Auxiliary Sanitary Association; Dr. M. J. Lehman, of *Times-Democrat.*

Missouri.—Drs. Speilgelhalter, Sudelking, of St. Louis Board of Health; W. B. Outten, M. P. & S. W. Railway System.

Ohio.—Dr. Lawrence C. Carr, Cincinnati Medical Society.

Tennessee.—Dr. G. B. Thornton, State Board of Health; John K. Speed, Merchants' Exchange; Sim. L. Barinds, Memphis Cotton Exchange; David P. Hadden, Memphis Board of Health.

Wisconsin.—W. M. Daniels, State Board of Health.

Mississippi.—Dr. F. W. Dancy, President State Board of Health; Dr. Wirt Johnston, Secretary State Board of Health; Drs. B. F. Kittrell, J. M. Taylor, S. V. D. Hill, C. A. Rice, W. F. Hyer, members State Board of Health; Maj. A. M. Paxton, Vicksburg.

The President, Dr. Gustave Devron, of New Orleans, addressed the Council as follows:

The gentlemen who have been previously present at sessions of the Sanitary Council of the Mississippi Valley may recognize in the presence of the present delegation representatives from States and from commercial and other interests not heretofore represented, they having been invited by the executive committee, who in tendering such invitation deemed the present convention of vital importance to all.

The main and sole object of this body is the protection of human life from imported and contagious diseases from any point, and this object is to be attained with the least possible restriction to travel and commerce. New Orleans has been considered the source of pestilence, producing yellow fever, and non-residents as well as residents sustained this view. Non-residents are also under the impression that the city is the source and cause of danger, while the citizens, or a part of them, recognized no necessity for quarantine.

Experience has taught the public at large, as well as the medical profession, that yellow fever does not originate in New Orleans, nor will it even propagate there to any excessive and dangerous extent if that city is kept clean. The experience and labor of the Sanitary Association in preserving the gutters, canals and streets in complete and good condition have proven the above assertions beyond a doubt; and as the merchants of New Orleans are fully aware that the city can never be a large and prosperous commercial metropolis so long as it is supposed to be a centre for the diffusion of yellow fever, they will contribute freely and with open hands funds to the Sanitary Association, and thus continue the good work of keeping the city clean and free from imported disease. Again, though the Board of Health of Louisiana is not represented in this convention, that body has given the visiting delegates from New Orleans every positive assurance that a strict and rigid quarantine shall be established and sustained from May 1 at all ports of entry in the State of Louisiana.

If any case or suspicious case of yellow fever should occur in the city of New Orleans, they have pledged themselves to give immediate, accurate, complete and truthful information of the same to the health authorities of this valley.

In order that this statement may not be taken as the opinion of a member of that Board, a special session will take place this very day, if it was not held within the past twenty-four hours, and resolutions will be passed to this effect, and will be transmitted to this convention before adjournment.

Moreover, if any question or request from this Council be transmitted by telegram to the president or conference committee of the Board of Health of Louisiana, a special meeting will be held and the answer thereto immediately returned, thereby securing a better understanding than can result from the assertion of any delegate from that body, who cannot bind the Board of Health by his representation or acts. The National Board of Health, through its secretary, has informed those interested in its objects, that it yet continues its work of inspection and co-operation with the State and local authorities, but as its time of existence is limited to some time in June, the successor to this organization must be created by the Council, in order that the old shotgun and other unnecessary quarantines be not repeated as they existed previous to the existence of the National Board of Health; and this is a subject of importance for the discussion, consideration and decision of the Sanitary Council of the Mississippi Valley.

The following committee, one from each State, was appointed to formulate such business of the council as may be presented: Drs. Speilgelhalter, Holliday, Carr, Kedzie, Daniels, Thornton, Griffith, Jones and Dickinson.

The following resolutions of the Louisiana State Board of Health were presented to the Council:

WHEREAS, at a conference meeting of several delegations of the medical, commercial and sanitary organizations of New Orleans, held on the 31st ultimo, it was resolved that the State Board of Health of Louisiana reaffirm and set forth its previous declarations in relation to matters connected with the prevention of the introduction of contagious diseases through the maintenance of a rigid quarantine during the summer months; be it therefore

Resolved, That the State Board of Health of Louisiana hereby declares as follows:

1. That it will maintain during the summer months a system of rigid maritime quarantine for the exclusion of contagious diseases, in accordance with the proclamation of the Governor, just issued.

2. That it will give to the boards of health of surrounding States prompt information of the appearance of yellow fever in New Orleans, and in *no manner* (in the future, as in the past) will it tolerate any attempt to conceal or suppress the knowledge of the existence of any cases or suspicious cases of that disease.

3. That it will permit its health records to be examined by any citizen of Louisiana or by any citizen of any other State, located in New Orleans, properly delegated by any kindred organization for the performance of that duty.

4. That the resources of the State Board of Health for quarantine purposes are fully adequate to enable it to guarantee that there will be no interruption to the same.

These resolutions were coldly received, and a determined effort was made to table them, as they were considered only a tardy concession to this council, and it was only by great efforts on the part of the members of the Auxiliary Sanitary Association that they were received and referred to the committee above-mentioned.

At the meeting, on April 4, the following resolutions were reported from the Business Committee, and adopted:

WHEREAS, As it is the sense of the Sanitary Council of the Mississippi Valley that the National Board of Health is the only body which possesses the confidence of the States of the valley, it is therefore recommended that,

First.—A committee be appointed by the President of the Council to petition the President of the United States to place the $100,000 epidemic fund in the hands of the National Board of Health for disbursement in case its use is demanded.

Second.—That in case the National Board of Health is deprived of the power of making inspection of persons and freight, when demanded by local doctors, health certificates issued under the supervision of representatives of the Sanitary Council of the Mississippi Valley shall be accepted as valid by Boards of Health of the Mississippi Valley, provided that said inspection be carried on under the rules and regulations heretofore prescribed by the National Board of Health.

Third.—That the Sanitary Council recommends that the States of the valley make voluntary contributions, to be expended under the Executive Commission of the Council to continue river and rail inspections in the event funds are placed in the hands of the National Board of Health for this purpose.

Fourth.—That the Sanitary Council recommends, for the guidance of health organizations in this valley, the system of inspection, isolation, disinfection and quarantine heretofore adopted by the National Board of Health.

Fifth.—That the communication from the Louisiana State Board of Health be received in the spirit in which it is tendered, and that their co-operation with the Sanitary Council of the Mississippi Valley in protecting the valley from epidemic disease be cordially approved and acknowledged.

In accordance with the resolution President Devron appointed a committee of one from each of the eleven States represented, to petition the President of the United States in reference to placing the necessary funds in the hands of the National Board of Health, to enable that body to continue inspection, or for other services required. The Governors of the respective States will be solicited to indorse the petition.

The following committee, representing eleven States, was appointed to petition the President of the United States: Drs. Debrell, Haskell, Kedzie, Dickenson, Speilgelhalter, Dancy, Jones, Speed, Carr, and Messrs. Fenner, Daniels and Hadden.

The third Wednesday in March, 1884, was selected as the time of the next session, the place to be stated by the Executive Committee.

The following officers were elected: Dr. Wirt Johnson, of Mississippi, president; David P. Hadden, of Memphis, vice-president.

The following resolution was introduced, Dr. P. H. Barton in the chair, and unanimously adopted:

Honor to whom honor is due. The commendable interest of the Auxiliary Sanitary Association, of New Orleans, as manifested by its local work in practical sanitation and its efforts to maintain a high standard of public health in that city since its organization in 1879, as well as to restore confidence in communities outside of New Orleans, having commercial intercourse with it, by the prompt publication of reliable information pertaining to the public health of that city, entitles it to the confidence and moral support of this Council, and the whole Mississippi valley; therefore

Resolved, That this Council, rightly appreciating the objects and efforts of the Auxiliary Sanitary Association in the delicate and responsible duties it has assumed, to preserve the public health, and at the same time maintain the integrity of the business interest of New Orleans and those having commercial relations with it, we hereby pledge our moral support to the Auxiliary Association as its just due, and heartily commend it to the confidence of all having commercial relations with New Orleans.

The Council then adjourned *sine die.*

In connection with the meeting of the Sanitary Council, the Jackson *Clarion* prints a letter from Dr. Charles Smart, Secretary of the National Board of Health, to Dr. J. H. Purnell, Secretary of the Memphis Board of Health, in reply to questions as to the action of the National Board during the yellow fever season. He says that as the Board has the authority and the means to open its stations in aid of State and local boards for the prevention of the introduction and spread of yellow fever, it proposes to do so sometime in May next, to co-operate with the local authorities as heretofore, and to continue the work until its authority shall have expired. If in the meantime the President should come to the assistance of the Board with the epidemic appropriation placed at his disposal (the $100,000 to be used by the President in case of actual or threatened epidemic), the work can be continued until the close of the season of danger; but, should the Board be disappointed in this, its power to aid will cease, and State and local authorities will have to take such action in the case as may seem good to them.

At their meeting in Jackson, the 2d inst., the Mississippi State Board of Health passed the following resolutions:

Resolved, By the Mississippi Board of Health, that the action of the National Board of Health in the past demand the unqualified endorsement of this State Board of Health; be it further

Resolved, That the President of the United States be and is hereby respectfully requested to entrust the expenditure of the contingent epidemic fund of $100,000. to the National Board of Health; be it further

Resolved, That the Secretary be instructed to forward the above preamble and resolutions to the President of the United States, by telegraph.

A STATE BOARD OF HEALTH IN MISSOURI.

The Missouri Legislature has passed a bill creating a State Board of Health. The Board, to be appointed by the Governor, consists of seven persons, to hold their office for seven years, except the first Board appointed, four of which shall hold for two years and three for four years. At least five members shall be physicians and graduates of respectable medical colleges, and shall have been residents of the State at least five years preceding their appointment. There shall be no discrimination between different schools of medicine. The Board shall have general supervision over the sanitary interests of the State, and may establish quarantine against infected cities or districts. The bill also requires the registration of physicians, and its details resemble the present Illinois law.

THE SANITARY IMPROVEMENT OF PARIS.

M. Oustry, the Prefect of the Seine, has submitted to the Municipal Council of Paris, a report prepared by M. Alphand, Chief of the Engineering Department, relative to the work which should be done to place Paris in a satisfactory condition from a sanitary point of view.

The first point insisted on by M. Alphand is a large increase in the water supply, which he wishes to be 400 litres (105 gallons) per head per day; and his estimate for aqueduct pumps and pipes for this purpose is 50 millions of francs. The estimate for the improvement of the sewers is 28 millions of francs, to which must be added 12 millions for sewage irrigation works.

In forwarding this report, the Prefect urges the necessity of completing the sanitary improvement of Paris with the least possible delay; of enlarging the water supply, completing a system of sewers, and improving the public buildings. He lays special stress on the need for improving the sanitary condition of the schools, and submits the following estimates of the sums required for immediate use:

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For enlarging water supply and improving sewerage, 90,000,000 fr.
For construction and repairs of buildings..... 10,000,000 fr.
For construction and improvement of schools..... 25,000,000 fr.

Making a total of 125 millions of francs, or about 25 millions of dollars.

If this programme is honestly and intelligently carried out Paris will resume her ancient supremacy as the most attractive capital of Eurpoe, a supremacy with the water famines, foul odors, and typhoid fever prevalence of the last two or three years have done much to destroy.

Gas and Electricity.

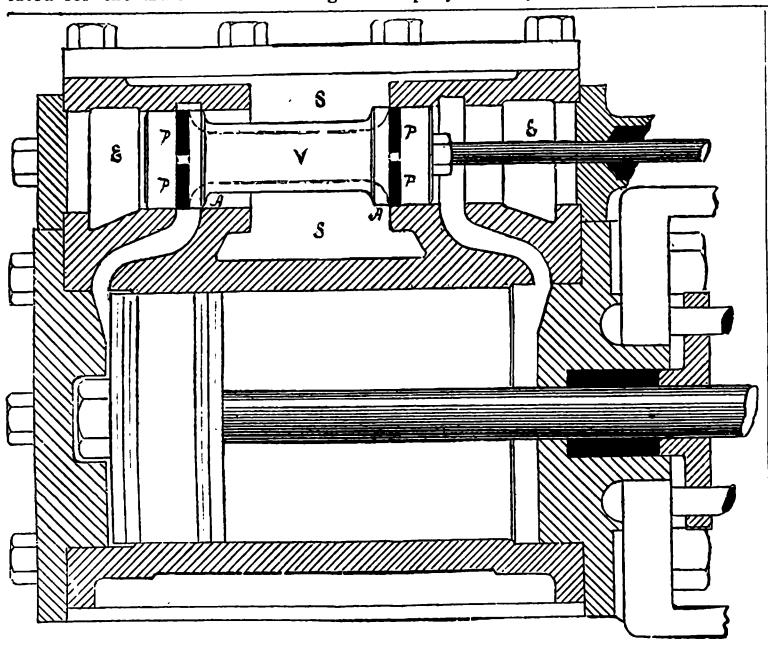
Illuminating Power of Gas in New York City.

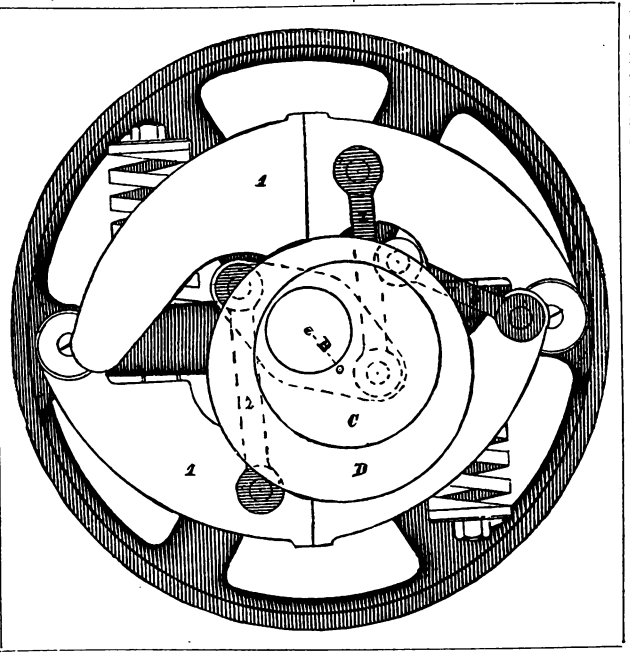
Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
April 14.....	27.63	19.86	23.19	27.84	29 82	19.97

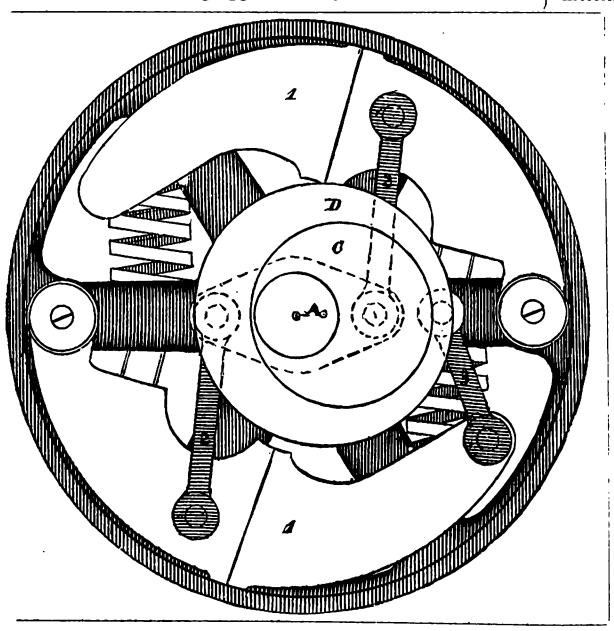
E. G. LOVE, Ph.D., *Gas Examiner.*

CUT-OFF FOR ELECTRIC LIGHT ENGINES.

We represent this week the variable cut-off motion of the Armington-Sims Co.'s steam engine for dynamos, maufactured for the Edison Electric Light Company. They claim that with this engine they have been able to secure better results than with anything they have hitherto tried. They further say that with throttling engines the governors do not respond promptly enough to give them the result desired, the trouble being aggravated by the fact of the uniform speed required for dynamos. To illustrate, if the variation of the speed of the engine is 15 per cent. for only 2 or 3 seconds at a time, though making only a difference of 3 or less revolutions per minute, should the average speed be 100, for ordinary purposes it might not be perceptible, but should a dynamo be attached and speeded to 1,000 revolutions per minute, the speed for one second of time may be increased from 16.6 revolutions to over 19, giving an irregular intensity to the light.







When the Elecric Light Company cannot have the dynamos run by such engines they prefer to take power from engines which are driving a constant and steady load, as in cotton mills, and as the power used by the dynamos is only a small percentage of the whole, the throwing off or on of a part of their machines makes no perceptible difference in the speed of the engine.

But this would never do in a place where the engine is liable to sudden and extreme change of load. The principle of the Armington-Sims engine is to change the travel of the valve without changing the lead by a centrifugal governor attached to the shaft, which operates an eccentric ring between the eccentric strap and the fixed eccentric on the shaft. The annexed diagrams show the details of construction.

Electric light engines require a minium of steam clearance; the steam contained between a throttling governor in the steam pipe and the piston chest being no inconsiderable factor towards irregularity.

ELECTRIC LIGHT NOTES.

Nashville papers report that the Brush Company are about introducing secondary batteries, and Swan lamps for domestic lighting in that city.

The Capital City Electrical Manufacturing Company, of Columbus, O., to manufacture electrical apparatus of all kinds, is to be incorporated this week.

The Board of Alderman have passed the resolution permitting the New York Electric Lines Company, to lay wires in the street, over the Mayor's veto.

The Railway Telephone Company filed a certificate at Albany, last week. Incorporators, Charles A. Randall and Philip Quackenboss, of this State, and Andrew E. Smytheand Edward K. Hyndman, of Pennsylvania. Objects of the company are to buy and construct lines of electric telegraph within and beyond the limits of this State and throughout the United States and the adjacent countries, especially for conveying telephonic messages for railway purposes.

Meter-ites.

The Gas-Light Company, of St. Louis, reduced their price from $2.50 to $1.50 per 1,000 cubic feet, last week.

The Rochester gas companies have agreed to furnish gas for heating and cooking, cheaper than for lighting.

Some of the leading business houses of this city have united to form a Gas Reform Association, to secure meter inspection by an inspector appointed by the Mayor.

The production of lamp black has been introduced at Saxton Station, Pa., in connection with the nataral gas well at that place. The gas is brought from the well in a main pipe, then distributed through branch pipes to 20,000 jets, which burn in contact with sheet iron plates. The product is 250 pounds daily.

At the meeting of the Engineers' Club, of Philadelphia, March 17, 1883, Mr. Chas. A. Ashburner read a paper on "A New Method of Estimating the Contents of Highly Plicated Coal beds as Applied to the Anthracite Fields of Pennsylvania." The questions of the future production and ultimate exhaustion of these fields, are of the greatest importance. In 1860 the population of the United States was 31,443,321, and 8.513,123 tons of coal were produced, *i. e.*, actually shipped to market; in 1870, the population had increased 22 per cent. (38,558,371) and the production of anthracite was nearly doubled, being 16,182,191 tons. For the year 1880, with a population of over 50 millions, the product was 23,437,252+tons. In 1882 the actual production was over 30,000,000 tons. It has been variously estimated that the 470 square miles containing this coal in Pennsylvania, will be entirely exhausted in from 140 to 204 years. While Mr. Ashburner does not estimate the ultimate exhaustion, he has devised a method for estimating the contents of these fields, from data now being obtained by the careful and practical geological and mining examinations of the State Survey. The exact position and detailed structural shape of the coal beds are first mapped by 50 feet contour lines along the floor of the beds, giving, completely and satisfactorily, their geometrical construction and shape. These surfaces are then developed into planes, by the development into straight lines of the line of the bed as cut by paralleled section planes 1,600 feet apart. This graphical method is attended with errors which are mathematically discussed, and which have been formulated by Mr. Arthur Winslow, Member of the Club. A practical test has been made of this method in the Panther Creek basin, between Mauch Chunk and Tamaqua, and the maximum possible error in estimating the surface area of the coal beds was found to be .905 of 1 per cent. After the areas are thus found, the contents are obtained by careful measurements made in the mines to ascertain the actual number of tons of coal which are contained in a unit (1 acre) of bed area. In this way it has been estimated that the above basin originally contained 1,032,000,000+tons; that the area under development originally contained 92,000,000+tons, out of which latter area 54,000,000+tons have been taken.

The weaving room of the Canada cotton mill at Cornwall, Ont., was visited last week by gentlemen connected with the Edison companies to inspect the system of lighting. Two dynamos supply 426 Edison lamps illuminating the large building, 500 feet by 120 feet.

The following figures concerning the illuminating gases of this city, are taken from the report of the Gas Examiner for the quarter ending March 31, 1883.

	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
Average Illuminating Power for the Quarter	24.97	18.66	21.42	27.26	29.47	18.99
Sulphur, grs. in 100 cubic feet.	3.37	12.55	19.45	7.36	3.97	22.03
Ammonia, grs. in 100 cubic feet.....	0.18	4.21	1.34	0.04	0 03	17.47
Specific Gravities.....	.617 to .642	.422 to .426	.551 to .559	.718 to .729	.650 to .658	.418 to .423

Construction Notes.

SAN FRANCISCO, CAL.—C. L. Crisman has received the contracts for constructing the sewer under Washington street wharf, giving bonds in the sum of $2,500.

BROOKLYN, N. Y.—The contract for laying the new Eastern District water main has been awarded to J. P. Crawford, the lowest bidder, for $35,226.36.

COLUMBUS, O.—The County Commissioners have decided that the bonds issued by them, April 7, for the construction of the Mill and State street bridges are illegal, and they have cancelled the contract entered into by them with Messrs. Preston, Kean & Co., of Chicago, Illinois.

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UTICA, N. Y.—A bill passed the New York Senate, the 10th inst., authorizing the Superintendent of Public Works to construct, at a cost not exceeding $10,000, a lift or drawbridge over the Erie Canal.

NIAGARA RIVER.—The contract for the new bridge of the Canada Southern Railway over the Niagara river, has been let to the Central Bridge Company of Buffalo.

CINCINNATI, O.—The State Senate, on the 11th inst., passed the bill authorizing the Water Works' Trustees of Cincinnati to issue $6,119,000 of bonds for improvements, and to let out the pumping into the reservoirs by contract. The fate of the bill in the lower house is regarded doubtful.

PHILADELPHIA.—The contract for paving on Richmond, Norris, Front and Chestnut streets, and Grand avenue, has been awarded to Michael O'Rourke, at $14,971.20.

SAN FRANCISCO.—The Committee of the Board of Supervisors have reported in favor of granting W. G. Long and J. D. Divoll the right to lay down water pipes, requiring the work to be done in accordance with all municipal regulations, and requiring the grantees to keep the streets in good condition whenever the pipes are laid.

ALBANY, N. Y.—The Common Council are discussing improvements in the water supply and receiving suggestions from citizens in general. This is very well as far as it goes, and is generally the way that the public have to be educated up to any large work. When all the amateurs and schemers have had their say, and have gotten things hopelessly muddled, the matter is put into the hands of men of experience and skill, and some practical project is developed.

WILMINGTON, DEL.—A bill was introduced into the State Legislature the 4th inst., which provides that water rates shall be fixed at prices that shall produce revenue sufficient at least to pay the interest on the water bonds and the running expenses of the water works, but no house having only a single hydrant shall be charged for the same more than $5 per annum.

The Wilmington, Del., water works supplied during the month of March, 1883, 119,379,520 gallons, as against 139,520,895 gallons pumped in March, 1882, a decrease of 14½ per cent, It is not stated whether any special measures have been taken to suppress waste.

Jersey City made a contract with Patrick Sheehan to clean the streets at $18,000 a year, and sold horses and carts belonging to the city. Sheehan found he had estimated the cost too low, and now the Legislature has, on his application, passed a bill nulifying the contract, and the streets are in a filthy condition.

A company has been formed to utilize the water power of the Androscoggin River at Rumford in Maine, where there is a fall of 162 feet in a mile. This magnificent water power has never been improved, mainly in consequence of its being off all lines of transportation. But railroads are now building which will make it accessible, and the lakes at the head of the river are to be operated as storage reservoirs for ensuring a supply in dry seasons.

The project for cutting a ship canal across Cape Cod has been revived again and a new company is applying to the Massachusetts Legislature for a charter.

The Boston *Sunday Herald* is opposed to *cheap men* in the Water Department, and says, very sensibly, that what is needed in the head of that Department is "the highest grade of scientific ability, combined with practical experience and administrative power, and, in order to obtain a person who possesses these qualifications, the city must be willing to enter the market, and hold out inducements quite as favorable as those which would be proffered by individuals or private corporations.

The Cincinnati *Commercial Gazette* very wisely advocates the creation of a State Commission for the investigation of methods of preventing the pollution of water courses by the refuse of manufactories and the sewage of towns.

An ordinance has been introduced in Philadelphia Councils, authorizing the Mayor to obtain from the American Society of Civil Engineers, the Engineer Corps of the United States Army and the Franklin Institute, the names of six engineers, to make a report of the most durable and best pavement that can be devised by them for the streets, particular regard being had to its healthfulness, economy, smoothness, durability and drainage, and estimating the probable cost of a better system.

The Massachusetts House Committee on Manufactures have reported a bill to establish a uniform standard hose coupling through the State, to be known as the Roxbury coupling, the male coupling to be 2½ inches internal diameter, from shoulder to washer seat one-inch, with seven threads to the inch, V shape, slightly flattened, horn band, 3⅞ inches in diameter; female coupling, swivel, 3⅛ inches in diameter outside, to have a clear water way of 2⅛ inches. No other coupling shall be used in the fire departments of cities and towns under penalty of $50, but this law shall not apply to couplings now in use.

The boring of the artesian well at Ocean Grove, N. J., which was to furnish supply of water, has been stopped. A depth of 175 feet was reached.

The Union Pacific Railroad is stated by the *Salt Lake Tribune*, to have bored a number of artesian wells along its line, with very successful results. Several are in the Bitter Creek Country, the most desolate on the line of the road, and noted for bad water, alkali and poverty of everything good. At Harper the boring is 400 feet deep; at Rawlins, 400 feet, the last 100 feet through granite; at Thayer, 900 feet; at Fillmore, 400 feet; at Table Rock, 1,450 feet through soft rock, and yielding poor water; at Red Desert, 760 feet; at Rock Springs a well 800 feet deep yielded poor water, and the company run water trains to supply the population of 1,500, mostly miners. On the Oregon Short Line, in the lava plains, where there was no water for 80 miles, between American Falls, and Wood River, a well has been drilled 18 miles from American Falls, striking a good supply of water 250 feet below the surface.

The Royal Commission appointed in June, 1882, to enquire into, and report upon, the system under which sewage is discharged into the Thames by the Metropolitan Board of Works, whether any evil effects result therefrom, and in that case what measures can be applied for remedying or preventing the same, has been taking voluminous evidence of both a popular, and a scientific character. Every class interested in or affected by the present system has been heard, and the commission is now receiving the reply of the Metropolitan Board of Works. The resulting Blue Book will be of great interest and value.

OIL REFINERY NUISANCES.

A conference of New York and New Jersey health officers was held at the Astor House, this city, on Saturday last, to discuss the best methods of concerted action for suppressing the nuisances arising from the petroleum refineries along the Kill von Kull, in the city of Bayone, N. J., opposite the villages of New Brighton and West New Brighton, Staten Island. The recent report of the New York State Board of Health to the Attorney-General, on this subject, is noticed in another column.

Among those present at the conference were the following: Dr. Elisha Harris, Secretary of the New York State Board of Health, Hon. Erastus Brooks and Dr. J. Savage Delevan, special committee on effluvium nuisances; Dr. E. M. Hunt, Secretary, and Prof. Albert R. Leeds, of the Council of Analysts, representatives of the New Jersey State Board of Health; Dr. McNeil, representative of the Hudson County (N. J.) Board of Health; Dr. Brush, representative of the Bayonne City Board of Health; Messrs. Stewart and L. W. Clark, representatives of the Staten Island petitioners for the abatement of the nuisances; and the inspectors employed by the New York State Board to make the examinations referred to in the abovementioned report, viz.: Mr. A. L. Colby, regular inspector of the New York State Board, Mr. Arthur Hollick, Inspector of the New York City Board of Health and Dr. Theodore Walser, Health Officer of Castleton, Staten Island.

Inspector Hollick reported the results of a re-inspection he had just made to ascertain whether the suggestions of the inspectors were being carried out. He reported the Standard Oil Company as hard at work doing all that was recommended; the Seaboard Refinery was also making the necessary changes; the French Oil Works had made only the recommended changes in the sewer, and the Ocean Refinery had done absolutely nothing. The discussion on the best mode of action was participated in by Drs. Harris, Hunt, McNeil and Brush, and Messrs. Brooks, Leeds, Stewart and Clark. Drs. Hunt and McNeil explained that legal powers were not vested in the New Jersey Board of Health, as in the New York Board, and that the proper method of legal action was through the Chancellor. Dr. Hunt related the circumstances of the case of a sludge acid factory at Elizabeth. The Chancellor was appealed to by a party of citizens and appointed a committee of experts with power; they took the control of the factory into their hands, running it when they wished to make experiments, and finally closed it permanently. It was stated that no other State had such direct and effective means of legal redress in the case of nuisances as New Jersey. Mr. Brooks moved that the local Board of Health of Bayonne and the Board of Hudson County apply to the Chancellor, at their discretion, for injunction against such works as continued to create nuisances. This motion was carried as the unanimous sentiment of the meeting.

Dr. Walser gave a vivid description of the effects produced by the sludge acid and other refuse matter from these Bayonne refineries, washed up on the Staten Island shores. He described the nuisance as really intolerable; comfort was impossible; people were actually made sick by the odors; the best people were moving away solely on this account; he would not live there himself if he could get away. Other business was transacted, and the meeting closed with a resolution of thanks offered by Dr. Delevan, on behalf of the New York Board, to the representatives of the several New Jersey Boards for their presence and counsel.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

At the meeting of April 4, 1883, the following candidates were elected as members: Thomas Appleton, Council Grove, Kan.; O. H. P. Cornell, Schenectady, N, Y.; G. H. Elliott, Norfolk, Va.; Orville Grove, Houston, Tex.; W. G. Williamson, Martinsville, Va. As juniors: F. L. Fuller, Boston, Mass.; H. McDonald, Nashville, Tenn. The preliminary arrangements were reported by the secretary, for the convention to be held at the cities of St. Paul and Minneapolis, Minn. The party will arrive at St. Paul about noon on June 19. It is intended also to arrange for a visit to the National Exposition of Railway Appliances, at Chicago, before proceeding to St. Paul. The death of Mr. Peter Cooper, on the morning of the meeting, was announced, and after remarks by Mr. Macdonald, it was ordered that an appropriate notice should be spread upon the minutes of the society. A paper by G. Y. Wisner, M. Am. Soc., C. E., on Geodetic Field Work, was read by the secretary, in the absence of the author, and was discussed by Messrs Haight, Prindle, Coes, and Geo. L. Greene, Jr.

COMPARATIVE EFFICIENCY OF NON-CONDUCTING COVERINGS FOR BOILERS AND STEAM PIPES.

In a paper read before the North of England Institute of Mining and Mechanical Engineers, by W. J. Bird, the following conclusions are drawn.

However good may be the non-conducting qualities of silicate cotton (mineral wool), it has always suffered from the drawback that it is of little advantage as regards durability, unless it is encased in iron, wood, straw, board or canvas, which increases its cost. It is advised that it should be applied in the form of a cement or composition which shall be self-adherent, and that will not destroy its porosity or impair its non-conducting value. Jones' silicate cotton cement, an attempt in this direction, not giving good results, while Dode's silicate cotton composition, which is self-sustaining, gives good results.

He gives a table from which may be observed the increase of efficiency obtained by increasing the thickness of coverings. Doubling the thickness of course means double the cost, whereas from average results it appears that if the thickness of the covering is doubled the non-conducting efficiency is increased only in the ratio of 1 to 1.16 or 16 per cent. Hence it may be concluded that the most essential requisite in a good covering is that it should possess a high non-conducting efficiency with a moderate thickness.

STEEL WATER PIPES.

The Chameroy Company make pipes of steel plate for conveying water under high pressure. The steel plates are coated with lead on both sides by immersion or otherwise, then rolled to form, riveted, and soldered the whole length, and covered with pitch. The first cost of the steel is not much greater than that of iron, and the steel pipes possess considerable advantages over those of iron. The lead coating is superior on account of the fineness of grain in the steel; the resistance to tensile strain and internal pressure is fifty to sixty times, and the resistance to deformation longitudinally from thirty to forty times greater, while the superior elasticity of the steel plate permits of the the pipes receiving tolerably hard knocks without being permanently deformed. For equal thickness the steel tubes stand twice the internal pressure of the iron, and being both light and strong, they are admirably adapted for laying down temporarily and taking up again.—*Iron.*

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BALTIMORE PLUMBERS.

The Master Plumbers of Baltimore held a meeting at Rain's Hall, on the evening of the 12th inst., and elected a temporary President and Secretary, and agreed to form a permanent association. A committee of five was appointed to draft a constitution and by-laws for the government of the same. The committee was instructed to report at a meeting to be held on the 19th inst.

The Journeymen Plumbers are also going to form a permanent association, and will hold a meeting on Monday evening, the 16th inst., to effect that object.

A CORRECTION.

Our attention has been called to an error in the data relating to meters, etc., in Providence, R. I., printed on page 362, issue of March 22, 1883, which should read 7.6 miles of pipe supplied with water, lying outside of the city limits, instead of 76 miles, as printed.

GOVERNMENT WORK.

Abstract of bids opened April 11, 1882, for iron work for the Washington Monument, by Lt.-Col. Eng., Thos. L. Casey: Phœnix Iron Co., of Philadelphia, $12,-044.93; J. B. & J. M. Cornell, of New York City, $11,-984; Phœnix Iron Co., of Trenton, N. J., $10,275. The award will not be made for several days.

BOOKS RECEIVED.

We have received from Mr. C. F. Hancock, the SUPPLEMENT to his REPORT ON THE DRAINAGE QUESTION, presented to the Hendon, Eng., Local Board, Nov. 25, 1882.

We have received from Mr. C. S. Parsons, of the Engineer's Department, THE ANUAL REPORT OF THE CITY ENGINEER OF BOSTON, FOR THE YEAR 1882.

FIRST ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF INDIANA, for the fiscal year ending October 31, 1882.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

380 South st, runs through to Front st, br build, cost $25,000; o, R. G. Mitchell & Co....860 Broadway, and 27 and 29 E 17th st, running through to 32 and 34 E 18th st, br store; cost $200,000; o, estate Daniel Parish, by Henry Parish; a, D. Lienau....10th av, n w cor 58th st, br and Jersey st dwel; cost $26,000; o, August Zinsser; a, E. E. Raht; m, J. & J. Weber; c, not selected....Av A, n w cor 52d st, br cigar factory, cost $75,000; o, Edward W. Candee; a, A. B. Ogden ....52d st, n s 44 w av A, two br and b st tens; cost ea $13,000; o and a, same as last....311 E 56th st; buildings, one on front of lot, br and st ten, cost $18,000; o, F. Handrich; a, Wm. Kahles; b, not selected ....254 W 37th st, b st front flat, cost $20,000; o. John J. Tobin; a, Thom & Wilson....58th st, s s, 200 and 320 w 1st av, six b st front flats, cost ea $16,000: o, Thos. Moore and Bernard Wilson; a, Thom & Wilson....16th st, n s 100 e 7th av, six br flats, cost ea $18,000; o, Michael Schachtel; a, Wm. Jose....92d st, s s, 105 w 4th av, seven br and b s (four b s fronts and three br fronts) dwells; cost ea $15,000; o, William Walker; a, Thos. E. Thomson....5th av, e s, 25 8 s 80th st, br and b s dwel; cost $60,000; o, Adolph Kerbs; a, D. & J. Jardine....3d av, n w cor 102 st, two br tens, cost corner, $12,000; other, $12,000; o, Patrick Kiernan; a, F. T. Camp....80th st, n s, 120 e Madison av, four b s front dwels; cost ea $18,000; o, Edward Kilpatrick; a, D. & J. Jardine....Boulevard, n e cor 82d st, two brick and Dorchester s stores and tens, cost $60,000; o, Christian Kruse, a, Wm. Kuhles....126th st, s s, 150 e 8th av, br store and hall; cost $10,-000; o, Andrew Johnson; a, G. Robinson, Jr....126th st, n s, 355 e 7th av, b s dwel, cost $22,000; o, Frederick Aldhouse; a, F. T. Camp ....10th av, e s, 163d and 164th sts, five fr dwels, cost ea $5,000; o, Martin B. Brown; a, D. & J. Jardine....Franklin av, e s, abt 200 n 170th st, two fr dwels, cost each $2,500; o and m, Peter Handibode; a and c, E. F. Dunn.

BROOKLYN.

Madison st, s s, 200 e Tompkins av, five b s dwels, cost each $4,500; o, a and b, Jas. A. Thompson ...Marcy av, w s, 24 s Heyward st, four br dwels; cost each $4,500; o, H. Grasman. ..President st, s s, 80 w 6th av, four br flats; cost each $7,000; o and b, J. M. Brown; a, C. B. Sheldon....North Pier Atlantic Dock Co, fr shed, cost $20,000; o, a and b, Atlantic Dock Co... Hancock st, n s, 50 e Bedford av, 3 b st dwels, cost each $8,000; o and b. S. E. C. Russell; o, J. D. Reynolds....318 and 220 Floyd st, s s, 400 w Lewis av, two fr dwels, cost each $3,000; o, Straub & Kramer, a, Th. Engelhardt; b, Geo. Straub. ..Berkeley pl, s s. 250 e 7th av, three b s dwels; cost ea $10,000; o, a and b, John Magilligan ...232 and 224 Floyd st, two tens, cost ea $4,000; o, and b, F. Weidner; a, Th. Engelhardt....Broadway, w s, 75 n Gerry st, two fr tens, cost $4,000; o and b, John Rueger; a, Th. Engelhardt....138 and 140 Gwinnett st, s s, 175 e Harrison av, two fr tens, total cost $7,000; o, Henry Sauer; a, J. Mesner; b, J. Sholt.... 11th st, s s. 288 w 8th av, br engine house, cost $10,000; o, City Brooklyn; b, T. Donlon and F. D. Norris....Bleecker st, n s, 128.6 e Myrtle av, four fr dwels; cost each $1,800; o, Katharine H. Lane; a, J. W. Ross; b, Cardwell & Hawkins... Fulton st, w s, 40 s Clark st, br and terra cotta store; cost $50,000; o, Ovington Bros.; a, R. B. Eastman; b, T. B. Rutan; c, not selected....Lincoln pl, s s, 250 w 8th av, two b s dwels; cost for both $20,000; o and c, E. H. Day; a, M. J. Morrill; m, J. J. Bentzen.

ALTERATIONS, NEW YORK CITY.

17 Warren st, erect party wall, fill up floor lights, etc; cost $7,500; Philip H. Adee, clerk St. Peter's Church; a, J. W. Ritch....645 and 647 8th av, br extension; remove hall partition, No, 615, etc; cost $-500. o. Samuel D. Townsend; a and c, J. H. Many; m, J. Rupert.... 148th st, s s, 100 e Bergen av, moved south and new foundation; cost $3,000; o, Jacob Cahn; a, A. Arctander....Broadway, n w, cor 22d st, new stairs from first story to basement and new iron stairs to street; extend show window and new door; cost $2,500; lessee, T. Kirkpatrick; o, H. W. Field; a, G. E. Harding....103, 105 and 107 Prince st, br extension, new store fronts, iron work and interior alterations; cost $20,000; o, John P. Townsend; a, Lamb & Rich.. 145 W 11th st, add two stories, also br extension; interior of house, also front, all new, cost $20,000; o and a, James J. Lyons....45 E 12th st, part of basement partition wall taken out, iron supports, front alterations, bay window, etc; cost $2,500; lessee, N. Houghton; a and c, — Fountaine; m —— Murtha....357 6th av, interior alterations, partitions, stairs; show windows, etc; cost $4,000; o, Mrs. Pell; lessee, Patrick McCann; b, P. J. Walsh; agent, Howard Pell.

ALTERATIONS, BROOKLYN.

Hudson av, s w cor Marshall st, add 23 feet to height, rebuild superstructure on Hudson av and Marshall st, and carry up other walls, cost $4,400; o, Atlantic White Lead Co, New York; a and c, W. N. Rae; m, P. Castner....Manhattan av, n w cor Greenpoint av, br extension; cost $2,800, o, John Krigles & Son; a, W. Vose; b, G. J. Roberts and S. D. Randall.

BOSTON, MASS.—41 Orchard st, 1 br dwel; o, Nathan A. Wilbor; b, Nathan S. Wilbor . 236-238 Lexington st, 2 fr dwel; o, James Frame; b, Frame & Patten....18 Clifford st, 1 fr dwel; o, George Davis... Chestnut av and Spring pl, fr dwel; o, Fred'k Koop; b, Jacob Leipold ...Rosseta and Eldon st, 1 fr dwel; o, Hazard Stevens; b, Sam'l T. Waters....K st cor E 8th st, bl of 3 fr dwel; o, Ellen P. Rich; b, D. A. Berry ...Unnamed cor Ellery st, bl of 7 fr dwel; o, Wm. T. Abbott; b, Jas. T. Smith....Wyman cor Gibbert sts, 1 fr dwel; o, John L. Dakin; b, John L. Dakin.... 46 Whitney st, 1 fr dwel; o, Jas. Harrigan....E 6th st, W O st, 1 fr hotel, Grant House; o, Phelix Smith; b, John Harrison.... Wayne st nr Blue Hill av, 2 fr dwel; o, N. A. Wood and J. F. Weatherbee; b, Wood & Weatherbee....Dale st, nr Walnut av, 1 fr dwel; o, William Donaldson; b, Wm. Donaldson.

CINCINNATI, O.—Bank nr Freeman, br dwel; cost $5,000; b, Jacob Moschel; b, Jacob Moschel... Moorman av nr Forrest, br dwel, cost $6,000; o, B. N. Moorman; b, B. N. Moorman... Park nr Vine, fr dwel; cost $5,000; o, Bella McIntyre; b, David Snyder ..State st nr 8th, br dwel; cost $9,000; o, A. Miller; b, Aufderbrink & Co...Betts st nr John, br dwel; cost $6,000; o, Jno. Hater; b, C. Glemsor ..Cor McLean and Harrison; stone fac; cost $12,500; o, m, Buck; b, S. L. Snodgrass....Cor Pearl and Walnut, alter brr cost $5,000; o, M. Levi; b, Wm. Wicker....Linn nr Wade, 10 b; dwels, cost $12,000; o, J. H. Empson; b, J. H. Empson.

CHICAGO, ILL.—Cor Warren av, and Leavitt st, br dwel; cost $7,000 o, J. Sweet; a, E. J. Brooks and Burnham; b, not let....Willard pl, br flat; cost $7,000; o, Mrs. M. L. Fowler; a, F. H. Waescher; b, Rossler & Winckler. .Market nr Van Buren br warehouse; cost $50,000; o, J. C. McCollom; a, F. H. Waescher; b, Rossler & Winckler....15, 17 Dearborn st, br st; cost $18,000: o, Porter Bros; a, L. G. Quackenboss; b, owner....Wabash av, nr 32d st, 2 br dwel and stables; cost $33,000; o, Alex. McIntosh; a, L. G. Quackenboss; b, owner....Schiller nr Wells st, br flats; cost $8,000; o, A. Mangson; a, F. H. Waescher; b, J. Mountain... Belleview nr Oak st, br dwel; cost $6,000; o, S. S. Greeley; a, H. M. Hansen; b, not let....Chestnut nr Cass st, br flats cost $15,000 o, J. C. Woelz a, H. M. Hansen; b, not let....35th st and South Park av, br flats; cost $38,000; o, H. Merkle; a, Furst and Rudolph; b, H. Apple... W Monroe nr Leavitt st, 4 br dwel; cost $20,000; o, Dr. C. Conyne; a, Dixon & Townsend; b, not let....W Monroe w of Leavitt st, br flat; cost $6,000; o, B. P. Moulton; a, Dixon & Townsend b, not let....Prairie av nr 29th st, br and st dwel; cost $14,000; o, E. P. Palmer; a, Dixon & Townsend; b, not let....1616 Prairie av, br dwel; cost $15,000; o, W. G. Hibbard; a, Treat and Folz; b, A. Biewolt etc.....1282 N Halsted st, br dwel; cost $5,000; o, E. Modelers; a, none; b, owner....87-93 N Oakley av, br flat; cost $6,000; o, P. Hursen; a, none; b, owner....20 Walton pl, br dwel; cost $12,000; o, H. H. Gardner; a, Julius Eader ...3564 S Halsted st, br dwel; cost $6,000; o, Jno, Wiese; a, none; b, owner.... 243 S Water st, br store (addition); cost $5,000; o, Thos. Hoyne; a, none; b, M. E. Price....251 S Clinton st, br factory; cost $80,000 o, Western Electric Co.; a, Bauer & Hill; b, M. E. Price..272-282 N Clark st, 6 br st and flat; cost $30,000; o, Hugh T. Birch; a, C. P. Thomas; b, M. Chambers....Clybourne av & A st, br factory; cost $5,000; o, V. W. Parlor Suit Mnfg Co.; a, none; b, J. Lulua ....188, 188½ Walnut av, 3 br dwel; cost $6,000; o, E. S. Brewer; a, none; b, owner....27-31 N Elizabeth st, 3 br dwel; cost $8,000 o, Monroe Frank; a, C. H. Gottig; b, De Lang & De Saby....De Kalb nr Cottage Grove, 3 br dwel; cost $7,500; o, Ald Campbell; a, Edbrooke & Burnham; b, owner....Polk nr De Kalb av, 3 br dwel; cost $6,000; o, Ald Campbell; a, Edbrooke & Burnham; b, owner.

HOLYOKE, MASS.—Mill; o. Merrick Thread Co.; a, E. C. Gardner.

MERIDEN, CT.—Orphans' Home; cost $22,000; a, E. C. Gardner; b, C. L. Little.

ROCKVILLE, CT.—Fr build; cost $12,000; o, G. Adams; a, J. M. Currier.

READING, PA.—15 Cotton st, build; cost $28,000; o, Homestead Building Association; a, Wm. A. Fink....10 Moss st, build; cost $25,000; o, Columbia Building Association; a, Wm. A. Fink.... 1 8th st, build alteration; cost $4,500; o, L. Dauth; a, Wm. A. Fink... 1 Franklin st, engine house; cost $8,000; o, City of Reading.

SIOUX CITY, IOWA.—Fourth st, bet Jennings and Virginia, three br stores; cost $8,000; o, J. P. Dennis; b, O. D. White.

(Continued on page 473.)

ABSTRACT OF BIDS FOR FIRE-PROOF SHEATHING FOR ROOF OF NEW PENSION BUILDING, AT WASHINGTON, D. C. (OPENED APRIL 7, 1883.)

NAME OF BIDDER.	RESIDENCE.	DIMENSIONS. Length.	Width.	Thickness.	Weight per □ Foot.	PRICE PER □ FOOT. Hard T. C.	Porous.	
		Inches.	Inches.	Inches.	Lbs.	Cents.	Cents.	
Raritan Hollow & Porous Brick Co..	New York	24	12	3	.....	13½	15	
Indianapolis Archtl. Terra Cotta Co.	Indianapolis	24	12	3	16	.....	28 9/10	Bid in gross, $20,000.
A. Hall Terra Cotta Co	Perth Amboy, N. J	17	17	3	12	.....	12	
Fire-proof Building Co	N. Y. City	.....	.....	3	.....	16	15	
Boston Terra Cotta Co.	Boston, Mass.	24	12	.. ....	10	.. ....	29	
		24	12	.....	12	.....	31½	
		24	12	.....	14	.....	34	
Wight Fire-proofing	Chicago, Ills.	16	12	3	12	9½	.....	Square ends.
						10	.....	Shaped to fit T irons. Hollow tiles.
		20	12	4	15	12	.....	Hollow tiles.
		24	12	4	15	13	.....	" "
		16	12	3	15	.....	13⅓	Slab.
Horace B. Camp	Cuyahoga Falls, O.	20	12	3	15	.....	14	"
		24	8	3	13	.....	13	
N. Y. Terra Cotta Lumber Co	New York	24	8-12	3	16	.....	20	
				3¼			17	
		16	8-12	3	16	.....	15	
				3¼			12	
Geo. Elbreg	Columbus, O.	24	12	3	15	.....	13½	Square openings.
Balto. Terra Cotta Co	Baltimore, Md.	24	12	3	.....	.....	17	Circular openings.
G. W. Rader & Co	N. Y. City	24	16	3	13	15	.....	Hollow tiles. Delivered
		24	16	4	15	20	.....	at wharf in Washington.
J. B. Kendall	Washington, D. C.	36	12	2	15	.. ....	9 9/16	
		24	12	2½ or 3	16 or 20	.....	16	
		24	6	4	19	.....	19	
		24	8	2¾	16½	.... ..	19	
		24	8	3 to 4	19	.....	19	
Potomac Terra Cotta Co	Washington, D. C.	18 or 24	12 or 16	3	.... ..	10	....	Hollow tiles.
				4		12		
		18 or 24	12	3	.. ..	.....	15	Slab.
		18 or 24	12 or 16	3	.....	.... ..	11	Hollow tiles.
S. E. Loring	Boston, Mass.			4			13	
		24	16	4	.....	.....	19	" " [36 in long.
Ottawa Tile Co	Chicago, Ills	24 or 26	11½	3	15	14½	... ...	" " 4c. extra if
		24	10	3	.....	... ...	20	Slab.

Experiments on strength and non-conducting quality of these tiles are now being made, and will consume some time. Until completed, no decision will be made.

WASHINGTON, D. C., *April* 10, 1883.

M. C. MEIGS,
Supv'g Arch't, New Pension Building.

TRENTON.—Governor Ludlow has signed the bill, amending the law passed last year, providing for the appointment of commissioners to determine upon plans for storing any water of the State for furnishing joint supply to cities.

The Chicago *Times* states that the early construction of a bridge across the Missouri river near Kansas City, for the Burlington and South Western branch of the Chicago, Burlington and Quincy R.R., is probable. A charter was obtained at the last session of Congress. Soundings have been made, and drawings for the bridge are in course of preparation.

The Light-house Board is making arrangements for constructing a light-house at Fourteen Foot Bank, Delaware Bay. There is available an appropriation of $175,000.

ILLINOIS.—A bill has been introduced in the Illinois legislature empowering the State Board of Agriculture to offer $5,000 in prizes for the improvement of roads and highways.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING APRIL 7th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	10	15.0	3	30 0			2															
Boston.....Mass	407,581	203	25.9	59	29.0	4	1	39	5	6	6	2	3		7	32		12	1	2	1		
Cambridge.....Mass	57,432	25	22.6	7	28.0	1		4				1				3		1					
*Worcester.....Mass																							
New Haven.....Conn	66,979	25	19.4	7	28.0		1	3								4		3	1	1			
Providence.....R. I.	116,755	65	28.9	11	16.9	2	1	6	1			1	10		1	10		2			1		
Total	683,266	328	25 0	87	26.5	7	3	54	6	6	6	4	13		8	49		18	2	3	2		
EASTERN CITIES.																							
Albany.....New York	98,430	53	28 0	22	41.5	3		9	2	1	1	1			1	9		3					
New York.....New York	1,299,249	746	29.9	275	36.8	14	9	125	13	11	26	6	4	11	28	134		43		24	10	1	9
*Brooklyn.....New York																							
*Hudson Co.....New Jersey																							
*Newark.....New Jersey																							
Camden.....New Jersey																							
Paterson.....New Jersey	54,012	16	15.4	8	50.0			3	1		1		1		1	1					1		
Philadelphia.....Pa.	58,324	22	19 6	11	50 0	1		2	1	1			1	1	2	3		1					
*Reading.....Pa.	907,043	462	26.5	149	32.2	6	1	52	6		17	5	15	4	15	39	11	13	1	1		1	1
Wilmington.....Delaware	46,885	24	26.6	7	29.1		1	3						1		1	1					5	
Total	2,463,947	1.323	27.9	472	27.3	24	11	194	23	13	45	12	21	17	47	187	12	60	1	25	11	7	10
LAKE CITIES.																							
Buffalo.....New York	168,702	51	15.7	17	33.3	4		5	2			1	1	1	2	7	2	1			2		
Rochester.....New York	92,116	48	27.1	10	20.8	1		8	2		1					4		6	1		1		
*Syracuse.....New York																							
Cleveland.....Ohio	192,084	64	17 3			1		4	1		3		4			5	1						
Detroit.....Michigan	131,118	55	21.8	27	49.0		1	6	1		7		1	1	3	6		5			1		2
Chicago.....Illinois	597,834	247	21.5	126	51.0	7	1	23	8	8	11	3	3	4	8	21	1	16			10		1
Milwaukee.....Wisconsin	135,233	54	20 7	31	57.4	1		3	2		1	1			5	7	1	2			1		1
Total	1,317,087	519	20 4	211	40 6	14	2	49	16	8	23	5	9	6	18	50	5	30	1		15		4
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	60	16.3	23	38.3	6	1	4			2				1	10	1	4			2		1
Cincinnati.....Ohio	267,767	118	22.9	51	43.2	1	1	17	1	1	2	2	1		5	17	2	10		2	4		6
Dayton.....Ohio	41,648	20	25.0	5	25.0	1		3		1						2							
*Louisville.....Ky.																							
Indianapolis.....Indiana	86,529	21	12.6	5	23.8		1	4		1				3	1	2	1				1		
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	26	13.8	13	50.0		2	2	2		4	1	1			4							
*St. Paul.....Minn																							
*St. Louis.....Mo.																							
Total	685,493	245	18.5	97	39.5	8	5	30	3	3	8	3	2	3	7	35	4	14		2	7		7
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.. " "	Wh.	136,471	60	22.8	8	13.3			6	2		1	1	1		6	8	1	2	2			
	Col.	71,103	50	36.6	7	14.0			10				1	1			5	2				1	
Richmond, " " Va.	Wh.	38,526	19	25.6	2	10.5			5		2												1
	Col.	29,394	22	38 9	7	31.8			6								2	1					
Charleston " " S. C.	Wh.	22,699	11	25.2	2	18.1			3			1					1						
	Col.	27,595	19	35.8	4	21.0			5														
Atlanta " " Ga.	Wh.	25,583	9	18.2	5	55.5											2				1		1
	Col.	19,221	14	37.9	9	64 2	1	2	4				1				3						
*Savannah " " Ga.	Wh.																						
	Col.																						
Nashville " " Tenn.	Wh.	31,993	15	24.3	6	40.0	1		1								2				1		3
	Col.	19,406	20	53.6	10	50.0			2								2		1		2		1
Memphis " " Tenn	Wh.	18,677	11	30.6	1	9 0	2				2						1						
	Col.	14,896	21	72.9	6	28 5			2		1				2		3						
*Mobile " " Ala.	Wh.																						
	Col.																						
*New Orleans " " La.	Wh.																						
	Col.																						
Total White	273,949	125	23.7	24	19.2	3		15	2	3	2	1	1		6	14	1	2	2	2		3	2
Total Colored	181,615	146	41.8	33	22.6	1	2	29		1		1	2	2		15	3	1		2	1	1	
Total in 28 U. S. Cities	5,605,357	2,686	24.9	924	34.4	57	23	371	50	34	84	26	48	28	86	350	25	125	6	34	36	11	23
Summary for 4 weeks, ending March 31, 1883	6,959,151	12,632	23.6	4217	33.3	338	62	1956	238	174	388	103	209	124	385	1562	98	537	28	112	169	210	122
Mar. 24—Total in 28 English Cities	8,620,975	4,304	26.1			122				37	21		47		81	165				55		8	99
Mar. 24, " 8 Scotch Cities	1,233,088	674	28.4			21				12	18		14		14					19			53

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an Urban population of 5,605,357 there died during the week ending April 7, 2,686 persons, which is equivalent to an annual death rate of 24.9 per 1,000, an increase on the preceding week, for which it was 23.2.

For the North Atlantic cities the rate was 25.0; for the Eastern cities 27.9; for the lake cities 20.4; for the river cities 18.5; and in the Southern cities for the whites 23.7, and for the colored 41.8 per 1,000.

Consumption caused 13.8 per cent of all deaths. In the North Atlantic cities it caused 16.4; in the Eastern cities 14.6; in the lake cities 9.4; in the river cities 12.2; among the Southern whites 12.0 and among the Southern colored 19.8 per cent.

Diphtheria caused 3.1 per cent of all deaths. In the North Atlantic cities it caused 1.8; in the Eastern cities 3.4; in the lake cities 4.4; in the river cities 3.2 and in Southern cities among the whites 1.6 per cent. It seems therefore to be increasing in Eastern cities and diminishing in those of the lake region.

Typhoid fever caused 1.8 per cent of all deaths. In the North Atlantic cities it caused 3.9 per cent being especially prevalent in Boston and Providence.

Scarlet fever caused 3.1 per cent. of all deaths. In the North Atlantic cities it caused 2.4; in the Eastern cities 3.5; in the lake cities 3.4; in the river cities 2.8; and in the Southern cities among the whites 4.8 per cent.

Pneumonia caused 13, and bronchitis 4.5 per cent. of all deaths. In the North Atlantic cities pneumonia caused 14.9; in the Eastern cities 14.1; in the lake cities 9.6; in the river cities 14.2; and in the Southern cities, among the whites 11.2 and among the colored 10.2 per cent of all deaths.

BOSTON, MASS.—C. E Davis, Jr., reports 14 new cases of diphtheria, 29 of scarlet fever and one of typhoid fever during the week.

DETROIT, MICH.—Dr. O. W. Wight reports 26 new cases of scarlet fever and 24 of diphtheria.

MILWAUKIE, WIS.—Dr. E. W. Diercks reports 31 new cases of

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TABLE SHOWING DEATHS IN TWENTY-SIX CITIES OF THE UNITED STATES FOR THE MONTH OF FEBRUARY, 1882.

CITIES.	STATES.	Total Population.	Total Number of Deaths.	Representing an Annual Death rate per 1,000 of—	Number of Deaths under Five years.	Number of Deaths over Sixty years.	Males.	Females.	Accidents.	Cerebro-Spinal Meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal Diseases.	Small-Pox.	Whooping-cough.	REPORTER.
Boston	Mass	410,376	675	19 70	206	131	304	371	23	3	127	14	16	37	6	10	1	13	71	....	36	2	1	9	..	....	Dr. S. H. Durgin.
Chicago	Ill	560,963	859	19.97	370	114	459	400	47	13	79	19	5	34	9	13	6	22	92	13	40	2	3	18	10	5	" M. K. Gleason.
Detroit	Mich	130,000	198	19.80	46	20	108	90	3	....	18	12	1	24	2	....	1	12	13	6	5	....	....	2	....	1	" O. W. Wight.
District of Columbia	White	126,300	170	16.15	39	....	91	79	2	....	26	4	2	5	....	2	2	11	20	2	2	....	....	1	1	....	" S. Townshend.
" "	Colored	65,680	157	28.68	73	....	79	78	5	....	39	1	....	1	..	4	1	1	23	1	9	1	....	....	....	....	
Evansville	Ind. White	26,565	51	23.04	29	6	....	....	....	....	6	1	....	1	3	1	.	....	11	1	2	....	....	1	....	....	" Chas. E. Lining.
"	Colored	2,712	20	88.24			....	....	....	....	5	..	1	....	....	....	....	..	4	....	1	....	....	....	....	2	
Hudson Co.	N. J.	203,681	367	21.60	147	46	....	....	7	3	53	14	5	18	....	7	....	15	50	1	9	1	3	....	....	....	C. J. Rooney, Jr.
Keokuk	Iowa	15,000	13	10.39	5	....	5	8	1	....	1	....	....	1	....	....	....	....	2	....	....	....	....	....	....	....	Dr. G. F. Jenkins.
Knoxville	Tenn. White	12,643	24	22.77	4	3	16	8	1	1	3	....	....	....	....	3	....	....	1	....	....	....	....	....	3	....	" S. B. Boyd.
"	Colored	4,508	17	45.25	6	....	7	10	1	1	3	....	....	....	....	....	....	....	3	....	....	....	....	....	3	....	
Lansing	Mich	8,319	5	7.84	3	....	....	....	....	....	1	....	....	....	..	....	....	....	1	....	....	....	....	....	....	....	" H. B. Baker.
Macon	Ga White	9,000	10	13.33	4	....	5	5	....	....	1	....	....	....	....	....	....	....	3	....	.	.	1	....	....	....	" J. E. Blackshear.
"	Colored	8,000	10	15.00	4	2	7	3	....	....	1	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	
Milwaukee	Wis	130,000	191	17.60	56	19	105	56	4	2	18	10	3	9	6	....	....	9	12	2	6	....	....	1	....	1	" R. Martin.
Minneapolis	Minn	80,000	89	13.32	31	10	45	44	6	3	5	6	1	6	1	10	..	....	8	1	2	....	....	1	2	1	" J. C. Cockburn.
Mobile	Ala. White	16,927	31	21 96	10	7	25	6	1	....	8	....	....	....	....	....	....	....	1	1	2	....	....	....	....	....	" E. H. Fournier.
"	Colored	14,368	20	16.62			8	12	3	1	5	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	
Nashville	Tenn. White	32,000	40	14.80	12	4	19	21	2	....	9	....	1	....	....	....	....	2	6	....	2	....	2	1	4	....	" R. Cheatham.
"	Colored	18,000	45	29.70	17		27	18	....	1	10	1	....	....	....	....	....	....	2	....	....	....	....	....	5	1	
New Haven	Conn	72,000	117	19.50	40	31	57	60	....	....	19	....	....	2	....	2	4	....	19	.	6	....	4	1	....	7	" C. A. Lindsley.
Norfolk	Va White	12,546	15	14.28	4	3	10	5	....	1	2	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	
"	Colored	10,454	31	35.52	17	3	18	13	1	....	....	....	....	....	....	....	2	....	8	....	....	....	....	....	....	....	" Jas. D. Galt.
Oakland	Cal	36,000	35	11.67	6	10	13	22	1	1	3	3	....	1	1	2	1	1	5	1	1	....	....	....	....	....	" J. R. Bradway.
Paterson	N. J.	55,000	89	19.44	34	15	42	47	1	....	17	1	1	2	....	....	....	....	....	13	....	..	....	..	....	1	" Geo. Boyd.
Providence	R. I.	116,755	146	15.00	42	40	75	71	4	2	25	2	5	3	4	6	....	....	15	2	5	....	1	....	....	....	" E. M. Snow.
Richmond	Va White	40,000	70	21.00	61	27	33	37	3	....	9	....	....	....	....	1	....	....	4	3	2	....	....	1	....	3	" J. G. Cabell.
"	Colored	28,000	79	33.84			36	43	8	....	14	1	1	....	....	.	.	....	9	2	4	....	....	....	....	2	
Rochester	N. Y.	100,000	121	15.70	32	33	65	56	4	1	18	....	1	5	3	....	2	2	9	.	7	1	....	....	....	....	" W. F. Sheehan.
Scranton	Pa	45,850	41	10.73	12	8	17	24	2	1	4	....	1	....	....	1	....	1	10	....	4	....	....	....	....	....	" T. P. O'Malley.
Selma	Ala White	3,425	4	13.92	1	....	3	1	....	....	1	....	....	....	....	....	....	....	1	....	....	....	2	....	....	....	" Benj. H. Riggs.
"	Colored	4,080	11	30.48	4	3	3	8	....	....	2	....	....	....	....	....	1	....	1	....	....	....	2	....	....	....	
St. Paul	Minn	53,683	103	22.04	43	7	64	39	6	1	8	4	....	10	....	3	....	2	16	....	3	....	....	....	....	....	" C. A. Wheaton.
Toledo	Ohio	60,000	57	11.40	23	11	32	25	....	1	7	1	....	3	....	1	....	1	11	2	3	....	....	....	....	....	" C. L. VanPelt.
Wilmington	Del White	43,200	64	17.71	28	14	....	....	....	....	7	2	....	....	....	1	....	2	2	1	2	....	....	1	12	....	" E. B. Fraser.
"	Colored	6,800	18	31.76			....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	1	8	....	
Total White		2,400,233	3,585	19.40	....	....	....	....	118	33	475	94	42	161	35	63	20	93	571			6	17	37	32	19	
" Colored		162,602	408	32.69	....	....	....	....	18	3	82	3	2	1	....	4	4	1	70			1	2	1	16	3	
Total in 26 Cities		2,562,835	3,993	20.32	1,409	567	....	....	136	36	557	97	44	162	35	67	24	94	641			7	19	38	48	22	

scarlet fever and eight of diphtheria, making a total of 13 of the latter disease and 58 of the former under treatment.

New York City Lunatic Asylum, Blackwell's Island.—Dr. T. M. Franklin reports 16 admissions, nine discharges and three deaths during the week; remaining under treatment, 1,344.

Richmond, Va.—In his report for the week Dr. J. G. Cabell states that a recent census, not quite completed, makes the population 70,684.

San Jose, Cal.—In his report for the month of March Dr. C. W. Breyfogle records a death from chloroform administered for the performance of a surgical operation on a boy fourteen years of age.

San Francisco, Cal.—During the week ending March 23 there were 101 deaths from all causes. The deaths under five years numbered 19. Accident caused three, cerebrospinal meningitis one, consumption 16, diarrhœal diseases one, diphtheria one, erysipelas one, typhoid fever two, scarlet fever one, pneumonia 12 and acute bronchitis four.

New Orleans.—The Board of Health report for the week ending March 31 did not reach us in time for entry in our table. The deaths numbered 188; white 95, colored 93, corresponding to death rates per annum of 43.73 for the whole population; 30.19 for the whites and 80.67 for the colored. Under five years, white 19, colored 20. Among the white people small-pox caused 20 deaths, scarlet fever two, malarial fever four, diphtheria one, consumption 15, bronchitis two, pneumonia 13, diarrhœal diseases three, and violence two. Among the colored people small-pox caused 49 deaths, typhoid fever one, malarial fevers four, erysipelas one, consumption four, bronchitis two, pneumonia six, and violence two.

During the three months from January 1 to April 1, there were 428 deaths from small-pox in New Orleans; 144 whites and 284 colored. In the same time deaths from all diseases footed up 1,977; 1,150 whites and 827 colored. In this same time the deaths, white and colored, from phthisis pulmonalis were 227. It will be seen that there were double the number of deaths from small-pox among the colored people than there were among the whites, although the whites outnumber the colored nearly three to one. During the entire year of 1882 the total deaths from small-pox in New Orleans were 415; whites 116, colored 299.

Michigan.—Dr. H. B. Baker's report for the week ending March 31 shows the following diseases as prevalent: bronchitis, consumption, neuralgia, rheumatism, influenza, intermittent fever, tonsilitis and pneumonia. Diphtheria was reported present at 14 places, and scarlet fever and measles each at 17 places.

Baltimore, Md.—The return from this city for the week ending April 7, shows a total mortality of 201; males 114, females 87; under five years 72, over 60 years 28. The annual rate per 1,000 during the week based on the estimation of the population by the local authorities was for the whole population 25.55, for the white 21.45 and for the colored 49.40. Among the white people consumption caused 21 deaths, malarial, typhoid and puerperal fevers one each, bronchitis two, pleurisy one, pneumonia 11, small-pox three, and violence two. Among the colored people consumption caused nine deaths, croup five, diphtheria nine, erysipelas one, scarlet fever seven, bronchitis seven, measles one, cerebrospinal meningitis two, pneumonia 13, small-pox eight and violence four.

Nashville, Tenn.—The city health officer, Dr. Cheatham, reports from Feb. 13, to March 13, 44 new cases of small-pox, 25 of which were sent to hospital and 19 isolated at their homes; of the former seven and of the latter eight terminated fatally.

During the same period the county health officer, Dr. Mitchell, reports 55 admissions to the county small-pox hospital, there being 42 cases on hand on Feb. 13. Of the total 37 have been discharged, 13 have died, 20 are convalescent, 10 are suspects and 17 in bed under treatment. Three of the cases were second attacks, each being well pitted from the former sickness. One of these died, a second recovered, and the remaining case is still under treatment.

Providence, R. I.—D. E. M. Snow, Superintendent of Health, says, in commenting on the mortality of the week ending April 7: "The total deaths numbered 65, representing an annual rate of 28.95 in each 1,000 of the population of the city. This number was 22 more than the weekly average for last year. There seems to be no special explanation in the causes of death last week of this increase in the number. The number from typhoid fever and from pneumonia was slightly greater; but the number from some other causes was less. The sudden increase must be considered accidental, and probably will not continue."

With regard to the recent recurrence of typhoid fever, which gave 48 new cases during the eight days from the 20th to the 27th of March, Dr. Snow remarks: "It is probable that the disease has reached and passed its height, and is now on the decline; and that as the weather grows warmer it will cease. There is nothing in the facts thus far that would justify any panic on the subject; nothing that would warrant the exaggerated statements that have been made of the prevalence of the disease in certain portions of the city; nothing that confirms the theories so persistently promulgated, of the cause or causes of the disease. It is certainly the duty of every good citizen to endeavor to allay rather than to increase excitement upon such a subject, and it is a gross outrage upon the community to make statements in regard to the cause of the disease which, if true, would and should create a panic, unless there is absolutely certain proof of their truth. We would conceal no truth, but would not draw hasty and dangerous conclusions from uncertain facts."

The case of small-pox recently treated in this city cost $91.66, and the city was reimbursed to the extent of $16.00, by the U. S. Government. Dr. Snow, in a letter to the Board of Aldermen, says: "In this case the patient was a sailor, who paid hospital money to the Government, and should have been supported in his sickness wholly by the Government; but the Government collects hospital money from all alike, and then, in Providence at least, makes no provision whatever for the support of those who are so unfortunate as to be taken sick with any contagious disease. This fact is highly discreditable, and it is possible that an appeal to the proper authority might bring a remedy."

Connecticut.—The report of the Secretary of the State Board of Health for the month of February shows acute diseases of the lungs as taking the leading place among the causes of death. Scarlet fever, while subsiding in the cities first attacked, is extending into other parts of the State, except in the southwestern part, where measles and whooping cough prevail. Winter cholera has been reported from some of the cities. Dr. Chamberlain adverts to the connection between foul air and pneumonia: "Persons coming out of ill-ventilated rooms, after breathing polluted air which has already induced some congestion of the lungs by its irritating qualities, readily take cold, and a congestion which induces inflammation is easily excited. It is well known that there is a type of pneumonia induced by foul, polluted air, even without subsequent exposure to the colder air out-of doors. Sewer gases from bad plumbing or imperfect drains, contaminated air from polluted soil around the house, by heaps of decaying filth or saturation by kitchen or other refuse, if drawn into the house or habitually breathed, so depress the system and lower vitality that disease is readily engrafted. During the prevalence of the present type of broncho-pneumonia, a severe cold should receive attention at all sacrifices. Neglect to care for what at first was apparently a trifling ailment, has caused the sacrifice of many valuable lives."

Ontario, Canada.—The *Provincial Bulletin* for the week ending March 31, shows a very large increase in the degree of prevalence of measles. This disease has increased to 10 per cent. of the total cases of disease reported. The little regard paid to its presence in a family makes this a centre from which it is spread rapidly in every direction. The retrogression of other diseases, such as scarlet fever and diphtheria, is noted. Bronchitis and influenza are prominent diseases.

Demerara, British Guiana.—Consul Philip Figyelmesy transmits reports from Georgetown and New Amsterdam for the month of January:

Georgetown.—There were 148 births; males 76, females 72: and 208 deaths, of which 95 occurred in hospitals and other public institutions; three in Colony Craft and River, while 37 were deaths of infants under one year, leaving 67 as occurring among persons of one year and upwards in the city. Twenty-nine of the deaths were caused by diarrhœa, five by dysentery, ten by malarial fevers, one by typhoid fever, one by erysipelas, three by leprosy, 25 by consumption, one by bronchitis, one by pleurisy, two by pneumonia, and five by violence. Population 47,175.

New Amsterdam.—Births 20; males 13, females 7. Deaths 39; quinsy, whooping cough, diarrhœa and dysentery each caused one death, malarial fevers two, and consumption two. Population 8,124.

Buenos Ayres, Argentine Republic.—Consul E. L. Baker reports a mortality of 835 as having occurred during the month of January, in a population of 300,000. Small-pox caused 152 of the deaths, and the disease is reported on the increase.

Scotland.—Consul J. A. Leonard sends the report of the Registrar-General for the week ending March 24. The death-rate in the eight principal towns was equal to 28.4 per annum per 1,000 of the estimated population. This rate is 5.9 above that for the corresponding week of last year, but 0.4 below that for the previous week of the present year. The lowest mortality was recorded in Aberdeen, viz., 1.24, and the highest in Glasgow, viz., 36.2. The most fatal miasmatic diseases were whooping cough and measles in Glasgow, and whooping cough in Dundee.

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Edinburgh.—Total deaths 79; no deaths are registered from small-pox, measles or fever; diphtheria caused three deaths, whooping cough three, scarlet fever one, diarrhœa one, acute diseases of the lungs 14, and violence three.

PARIS, FRANCE.—There were 1,316 deaths during the week ending March 21, as compared with 1,209 in the previous week; males 741, females 575; under five years 349, over 60 years 317. Annual rate, 30.53. Tyhpoid fever caused 39 deaths, small-pox nine, measles 25, scarlet fever one, whooping cough nine, croup and diphtheria 43, erysipelas three, puerperal infection one, consumption 306, acute bronchitis 54, pneumonia 128, and violence 32. The rise in the mortality rate is mainly due to consumption and pneumonia. So high a total from consumption has never before been recorded in the *Paris Bulletin*. On March 18, there remained in the hospitals 97 cases of small-pox, 275 of typhoid fever, and 48 of diphtheria.

RHEIMS, FRANCE.—Consul John L. Frisbie reports 68 deaths during the week ending March 17, equal to an annual rate of 37.68; males 41, females 27, under five years 29, over 60 years 16. No death is reported from violence, measles, puerperal fever, scarlet fever, typhoid fever or diarrhœal diseases. Whooping cough caused one death, croup and diphtheria four, erysipelas one, small-pox one, bronchitis and pneumonia 14, and consumption seven.

BRUSSELS, BELGIUM.—During the week ending March 17, there were 279 births, and 240 deaths in the city and its *faubourgs*, corresponding respectively to the annual rates of 34.7 and 30.5. Deaths under five years 114. Small-pox, measles and croup caused four deaths each, scarlet fever and typhoid fever two each, diphtheria none, whooping cough six, diarrhœa and dysentery 23, bronchitis and pneumonia 49, and consumption 30.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 92 deaths during the week ending March 10; males 51, females 41; under five years 41, over 60 years 30. No death was occasioned by small-pox, whooping cough or typhoid fever. Measles caused 10 deaths, scarlet fever four, peurperal fever one, croup and diphtheria four, diarrhœa seven, consumption 11, pneumonia 14, bronchitis three, and violence two.

The following cases of disease were reported during the week ending March 17: measles 40, scarlet fever 19, typhus three, typhoid fever 2, erysipelas two, puerperal fever none, whooping cough nine, diphtheria nine, croup one, diarrhœa 25, tonsilitis 10, pneumonia 11, pleurisy two, and acute bronchitis 82.

COPENHAGEN, DENMARK.—There were 134 deaths during the week ending March 13; under five years 56, over 60 years 38. No death was registered from small-pox or measles. Scarlet fever caused one death, diphtheria two, croup two, whooping cough four, typhoid fever two, diarrhœa three, erysipelas one, puerperal fever one, consumption 18, pneumonia six, bronchitis 14, and violence one.

During the week the physicians reported cases as follows: Small-pox none, measles one, scarlet fever 23, diphtheria five, croup one, whooping cough 96, typhoid fever five, dysentery one, diarrhœa 67, erysipelas 26, puerperal fever one, bronchial catarrh 399, pneumonia 67 and tonsilitis 128.

ST. PETERRBURG, RUSSIA.—Consul-General Stanton reports 753 deaths for the week ending March 10; males 440, females 313; under five years 335, over 60 years 88; population 929,525. Thirteen deaths occurred from small-pox and 40 from fevers. There remained under treatment in the city hospitals on March 11 1,204 cases of fever, 61 of small-pox and 1,132 of several diseases.

Dr. E. R. Hawn, late Secretary of State of Indiana, has been elected Secretary of the Board of Health of that State, in place of Dr. T. M. Stevens.

The Montreal Board of Health advocates compulsory vaccination for all children in the city.

A pie made from canned grapes is believed to have poisoned five persons in West Bloomfield, Ont., recently. The grapes have been sent to Prof. Lattimore for examination.

The Ohio Senate has passed the bill dividing Cleveland into sewerage districts.

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U. S. ENGINEER OFFICE, 1125 GIRARD ST., PHILADELPHIA, PA., *March* 29, 1883.

Sealed proposals, in triplicate, will be received at this office until 12 M. of Saturday, April 28, 1883, for dredging at the entrance to Indian River, Delaware.

For forms of proposals and all information, apply at this office.

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REMOVAL OF OLD ICE PIERS NEAR PORT PENN, DEL.

U. S. ENGINEER OFFICE, 1125 GIRARD ST., PHILADELPHIA, PA., *April* 5, 1883.

Sealed proposals, in triplicate, will be received at this office at 12 o'clock, M., of Saturday, May 5, 1883, and opened immediately thereafter, for the removal of six sunken ice piers in the Delaware River, near Port Penn, Del.

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PROPOSALS FOR GLASS.

OFFICE OF THE SUPERINTENDENT, CUSTOM HOUSE, ETC., CLEVELAND, OHIO, *April* 11, 1883.

Sealed proposals will be received at this office until 12 M., on the 28th day of April, 1883, for furnishing and delivering ready for fixing in place, all the plate, double thick sheet, double thick sheet ground glass, required for the Custom House, etc., at *Cleveland, Ohio*, in accordance with specification, schedule and diagrams, copies of which, and any additional information, may be had on application at this office, or the office of the Supervising Architect.

LEVI O. SCOFIELD *Superintendent.*

NOTICE TO CONTRACTORS.

The Board of Commissioners of Porter County, Indiana, will receive proposals until two P. M., May 24, 1883, for the erection of a Court House in the city of *Valparaiso*. The plans and specifications can be seen at the Auditor's office in Valparaiso, and at the office of J. C. Cochran, architect, No. 78 Ashland Block, corner Clark and Randolph streets, Chicago. Contractors can obtain printed instructions as to requirements and form of proposals, upon application to the auditor or architect.

[Signed] L. P. SCOTT, N. PICKRELL, F. BURSTROM, *Board of Commissioners.*

[Attest] W. E. BROWN, *Auditor Porter County.*

PROPOSALS FOR IRON RAILING AT ST. LOUIS, MO.

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., *April* 14, 1883.

Sealed proposals will be received at this office until 12 M., on the 4th day of May, 1883, for furnishing and fixing in place complete, the iron railing for areas of the Custom House, etc., Building at *St. Louis, Mo.*, in accordance with drawing and specification, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

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The following firms solicit correspondence, and will furnish illustrated circulars, if requested. It is desired that this paper be mentioned when application is made.

ARCHITECTS' AND ARTISTS' SUPPLIES.—Wadsworth Bros. & Howland, 84 Washington Street, Boston, Mass. Catalogues on application.

*DUMB WAITERS.—Hydraulic Double-acting Dumb-*Waiters, or Single-acting, manufactured by the *Granville Hydraulic Elevator Co.*, 1193 Broadway, N. Y.

DRAWING AND SURVEYING INSTRUMENTS and Materials. G. S. Woolman, 116 Fulton Street, New York. Send for Illustrated Catalogue.

EARTH CLOSETS.—Myers Sanitary Depot, 94 Beekman Street, New York. Circulars on application.

*ELEVATORS.—Hydraulic, Passenger, Freight and Side-*walk Elevators, m'f't'd by the *Granville Hydraulic Elevator Co.*, 1193 Broadway, N. Y. Send for Illustrated Circular.

GREEN HOUSE HEATING BY STEAM.—Gillis & Geoghegan, 116 and 118 Wooster Street, New York, N. Y.

MATHEMATICAL INSTRUMENT MAKERS.—Young & Sons, 43 N. 7th Street, Philadelphia. Patented Improvements on Levels, Transits, etc. Manual and Catalogue upon application.

PLUMBERS' BRASS WORK.—Fine Goods. Special prices. Hedges & Bro., Newark, New Jersey.

PLUMBERS' SUPPLIES.— Meyer, Sniffen & Co., 46 and 48 Cliff St., N. Y. The Hellyer Water Closet and Royal Porcelain Bath Tub.

WROUGHT IRON PIPE.—Pancoast & Rogers, 23 Platt St., N. Y. Wrought Iron Pipe, Boiler Tubes, Cast Iron Water and Gas Pipe. See advertisement.

Employment Wanted.

Under this head we will insert advertisements, not exceeding four lines, free of charge, for persons seeking employment. This privilege is restricted to persons employed by *Architects, Civil Engineers, Chemists, Electric Light Companies, Gas Companies, Plumbers and those engaged in the business of Heating by Hot Air, Hot Water and Steam.*

A YOUNG MAN, giving best of references, is desirous of obtaining a position in some large wholesale metal or hardware house. Address A. W. PAYNE, Stamford, Conn.

PLUMBER, with 15 years' experience, wishes a position either as journeyman or boss, can furnish good references.
WILLIAM MURRAY,
22 Carlton Avenue, Brooklyn, N. Y.

A YOUNG MAN desires a situation as manager or assistant in a gas works. Understands both manufacture and distribution; also book-keeping, gas and steam fitting. Good references. Address, J. L. STAMFORD, Manager Gas Works, Dundas, Ontario.

A FIRST-CLASS Plumber, with 14 years city and country experience, wants steady work in country.
Address, A. E., care of this office.

A FIRST-CLASS Plumber and gas fitter, (an old hand at the business) wants steady work. Understands lead burning. Address, MICHAEL GAFFNEY, 229 Bank St., Newark, N. J.

AN A-1 Plumber, who can also do gas fitting; has had 10 years experience, wants country work.
Address, T. C., care of THE SANITARY ENGINEER.

WANTED.—A situation by steam fitter, city or country; can furnish good references. J. F., SANITARY ENGINEER.

WANTED.—A situation by a first-class steam and gas fitter, city or country; can furnish first-class references. Address, A. F. MOUNT, 299 Rivington Street, New York.

WANTED.—A situation by plumber; can furnish good references. Address S. A. E., 512 Quincy Street, Brooklyn, N. Y.

SITUATION wanted in a jobbing shop, by a young man (23); good at wiping joints; can do gas-fitting; wages no object. Address, PLUMBER No. 1, SANITARY ENGINEER.

PLUMBERS.—Wanted a situation by a young man (25); good at wiping joints; can do gas fitting; has had his tools one year. Address, A. B., SANITARY ENGINEER.

WANTED.—Situation in a first-class Plumbing Shop, by a young man to finish learning the trade. 3 years' experience. Address, J. Macauley, No. 17 Carlton Ave., Brooklyn

WANTED by a first-class Plumber, disabled for heavy work, a situation as General Jobber or Superintendent; thoroughly competent, middle age, good address. Address, PLUMBER, care Tatem & Sketchley, 32 S. Fourth St., Philadelphia, Pa.

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BUILDING INTELLIGENCE.

(Continued from page 468.)

ST. LOUIS, MO.—Gamble av, bet 22d and 23d sts, br dwel; cost $6,500 o, H. Temme; a, Beinke; b, C. H. Poetner....Franklin avenue, bet 27th and 28th sts, store and dwel; cost $12,000; o, J. F. Conrad; a, J. H. McNamara; b, P. Ratz....Russell av bet Compton and Louisiana av, br dwel; cost $9,500; o, Geo. O. Carpenter, Jr.; a, E. A. P. Newcomb (Boston Mass.); b, Daniel Evans....11th st, bet O'Fallon st and Cass av; br ten flats; cost $10,000; o, H. S. Wilde; a, Koenig; b, H. Hermann....16th st, bet O'Fallon st and Cass av, br furniture warehouse; cost $6,000; o, J. Peters; a and b, Wm. Kerksick.

WILLIMANTIC, CT.—Fr build; cost $7,000; o, H. Kingsley; a, E. C. Gardner.

WASHINGTON, D. C.—N. J. av bet B and C, n w, br dwel and cellar; cost $5,500; o, C. Kennedy; a, C. Kennedy....86 20th nr Mass av, 3 br dwel; cost $18,000; o, Robt. T. Fleming....1133 5th st, br dwell; cost $5,000; o, G. W. Uttermehle....H st bet 9 and 10; cost $7,000; o, M.A. Darhield; a, Frank Harvey....60 and 62 K st; 2 br dwell and cellar; cost 5,000; o, and a, C. W. Handy ...W bet 13th and 14th, br. stable; cost $12,000; o, and a, W. & G.R. R. Co.... Cor P and 6th st; $15,000; o, and a, W. Z. Partello....Corcoran bet 13th and 14th st, br dwel and cellar; cost $30,000; o, John Sherman; a, C. C. Martin....N. J. ave bet K and L st, br dwel; cost $5,400; o, and a, C. W. King.

WORCESTER, MASS.—Trumbull st, br stable; cost $8,000; o, Geo. Sessions; a, Barker Nouse; b, B. C. Jaques .. Cedar st, fr dwel; cost $8,000; o, M. Manning; a, A. P. Cutting; b, Aug Balcome ....Kingsbury st. fr dwel; cost $5,000; o, S. S. Gray; a, Barker & Nouse; b, L. T. Houghton... Benefit st, br dwel; cost $6,000; o, Jessie Smith; a, E. Boyden & Son; b, J. R. Fish ...Front st, br. block; cost $20,000; o, G. H. Whitcomb; a, S. C. Earle; b, S. H. Batchelor....Front st br block; cost $85,000; o, J.G. Clark; a, S. C. Earle; b, C. Buzzell.

WESTBOROUGH, MASS.—br school house; cost $9000; o. Town of Westborough; Barker & Nourse, of Worcester; B. C. Hathway, of Westborough.

CLINTON, IOWA.—br dwel; cost $15,000; o, S. B. Gardner; a, Edbrook & Burnham; b, by the day.

LA PORTE, IND.—fr dwel; cost $5,000; o. R. Davidson; a, Edbrook & Burnham; b, not let.

SOUTH BEND, IND.—br and sl dwel; cost some $18,000; o, Dr. J. A. Magill.

LAKE VIEW, ILL.—br dwel; cost $8,000; o, M. Brauckmann; b. J. Wolcott.

OTTAWA, ILL.—br and sl dwel; cost $25,000; o, Thomas Burker; a, L. G. Quackenboss.

CENTRAL PARK VILLAGE, COOK CO., ILL.—fr cottage; cost $5,000; o, Hy. Brummel; a, Furst & Rudolph; b, owner.

LAKE VIEW, ILL.—br. dwel; cost $9,000; o, C. W. Webber; a, Frust & Rudolph; b, Jno. Eberlein.

OAK PARK, ILL.—fr st basement; cost $15,000; o, Wm. Clapp; a, Dixon & Towsend; b, Joel Bullard.

JANEVILLE. WIS.—br dwel; cost $10,000; o, C. W. Hodson; Dixon & Townsend; b, Joel Bullock, not let.

MISCELLANEOUS.

ALBANY, N. Y.—A bill has been introduced in the Senate appropriating $125,000 for the building of a Normal school

CHICAGO, ILL.—H. Siercks, architect, has plans for a four-story and basement building, corner of Michigan and La Salle streets, to be used as a leather house. Mr. W. C. Lobenstein is the owner. Mr. Siercks has also completed the designs for a block of six houses for Mr. M. G. Reithel, on Hoyne avenue, near Lexington, to cost $30,000.

LOUISVILLE, KY.—A union depot will be built on Main, between Fifth and Sixth streets, by a syndicate of which Mr. J. Gould is chief. It will cost $400,000....The Lighthouse Board have accepted plans for the erection of new lighthouses at Mosquito Inlet and Cape San Blas. The amount and appropriations available for the first is $60,000, and for the second $35,000.

MEMPHIS, TENN.—Mr. John Reed has the contract for constructing a marine hospital to cost $38,775.

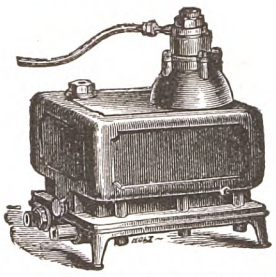
TROY, N. Y.—Edward Kelley has the contract for a three-story brick house for Mr. William Walsh, on North Third street near Vanderheyden, to cost $5,000; and for two brick dwellings of two stories each, for Mrs. Catharine Noonan, on South street near Eighth; to be built at a joint cost of $5,000.

TOLEDO.—Mr. Bacon has plans for a residence, to be erected on Collingwood avenue, by Mr. S. S. Laskey. It is to be of brick, two stories and basement, with modern conveniences. It will cost $15,000 ...On the corner of Nineteenth and Washington streets, Mr. S. H. Morgan will erect two dwellings, after the plans drawn by N. B. Bacon. They will be two-story frames, and will cost $6,000....Alexander Webber will construct a dwelling on Erie street, between Locust and Lagrange, two stories and basement, from plans by Bacon; to cost $7,000 ...N. B. Bacon is completing plans for the front of a three-story brick block, to be erected by Mr. Tracy, Sr., on the site adjoining Eaton's. It will be used for stores when completed, and be ready in July....The brick block to be erected by E. D. Potter, Jr., on Berry street, will be three stories high, and cost $15,000....The building to be erected by M. A. Scott, on Adams street, was planned by N. B. Bacon. It is to be of brick, two stories high with basement. It will have appliances for the bottling business and will cost $8,000....An imposing structure is to be built by Calvin Bronson, on the corner of Summit and Adams streets. E. O. Fallis is the architect. It is to be of brick, cut stone trimmed; four stories high, and completed by September 1....Mr. Sam. Fisk will erect a block of three dwellings at the corner of Seventeenth and Monroe streets. They were planned by E. O. Fallis; will cost $9,000, and will be finished by September 1....A double dwelling is to be erected on Twelfth street, near Adams, by A. M. Woodson and H. B. Tillinghast, from a design by Fallis. To be built of brick, at a cost of $6,000....The Toledo, Cincinnati and St. Louis Railroad Company contemplate the construction of 500 feet of docks, a grain elevator, and other improvements, to be completed the 1st of September. In the Fifth Ward, Mr. Rathburn Fuller is building a residence, in Queen Anne style, on Monroe street, to be completed in June, costing $7,000. H. J. Platfoot & Co. are the builders....The residence of Clarence Brown, on Collingwood avenue, will cost $5,000, and be ready in June. H. J. Platfoot & Co. are the builders ...The residence of J. G. Kaney, on Warren street, near Woodruff, is nearing completion. It is in Queen Anne style, of brick and cut stone trimmed, with modern conveniences, and will cost $7,000....The Burnett House is to be enlarged by an addition four stories high, to be built of brick, with cut stone trimmings. The other portions of the hotel will be remodeled to correspond with it, at a total cost of $17,000. The work will be completed August 1.

WILMINGTON, DELAWARE.—Messrs. J. Newlin and Alfred Gawthrop are preparing to build themselves a handsome edifice for stores, at the southwest corner of Fourth and Shipley streets. It will be two stories in height, built of brick, trimmed with Ohio stone. When finished it will cost $29,000, and be a credit to the architect, E. W. Thorne. J. R. D. Seeds & Son will probably receive the contract for building. The Messrs. Gawthrop are building the foundation and cellar themselves.

1883 IMPROVED 1883

Automatic Beer Pump.



Responsible and Energetic Plumbers can largely add to their busines by acting as agents and erecting these pumps.

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E. F. AMES, General Agent.

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AND WATER PIPES.

A few words on their Arrangement and Management; more especially their treatment during Frost, and how to avoid Explosions. By H. Grimshaw, F. C. S., late Demonstrator in the Laboratory of the Owens College, Manchester. Price, 40 cts.

For sale by Book Department, The Sanitary Engineer, 140 William Street, New York. P. O. Box 3037.

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Manufacturers of

LINSEED OIL and LINSEED CAKE,

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STEAM PUMPS.

For Every Imaginable Service.

A large number of these Pumps have been put on every variety of service during the past three years, with the best results.

The Pump is simple in construction, having a smaller number of moving parts than others.

It will work equally well under a light or heavy pressure, at a higher speed, with less noise than any other steam pump, and is suited for every variety of sevice.

All Pumps are tested at the factory under all possible speeds and pressures.

We are prepared at present to furnish all the leading sizes, and are constantly making additions to our patterns.

Send for price lists and discounts to the

HOLLY MANUF'G COMPANY, Lockport, N. Y.,

Or C. G. HILDRETH, Secretary,

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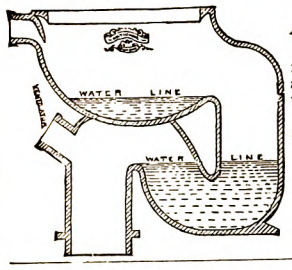
The "National" Patent Side Outlet Closet and Trap.

WITH IMPROVED FLUSH. (Registered).

Made either complete in one piece of Earthenware, or in two pieces with Basin and Trap separate.



An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin.

The Most Cleanly, Durable, Effective and Cheapest Closet and Trap ever used, requires no fittings nor Machinery of any kind, and cannot get out of order.

For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

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Sole Agent for the Manufacturer, E. ASPINALL, 206 Pearl Street, New York.

PLUMBERS' AND SANITARY EARTHENWARE OF ALL DESCRIPTIONS.

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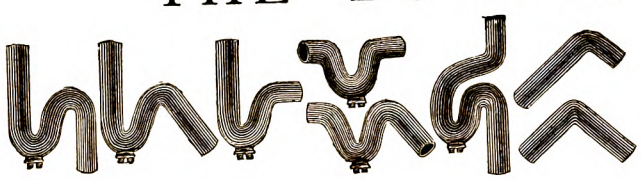
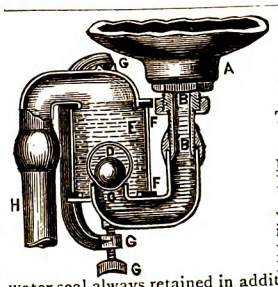
THE "DU BOIS" TRAPS.



These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

For sale by all dealers in Plumbers' Supplies.



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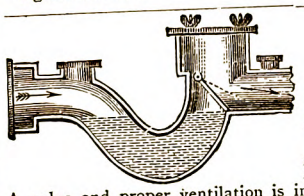
The only Brass Trap in the market.

Recommends itself to Architects, Plumbers, Sanitary Engineers and Builders, because:—

It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted Glass or metal section furnished at same price. Send for circular and price list.

BENNOR SYPHON TRAP CO., (Limited),

Agents wanted. *17 North 9th St., Philadelphia, Pa.*



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IMPROVED

IRON SEWER GAS

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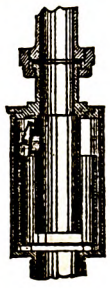
BACK WATER TRAP

Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.



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Cannot siphon out.

Water seal always perfect.

Made of Brass, Porcelain or glass. When of Glass, the workings and benefits of the invention are plainly seen. Send for illustrated Circular. Address,

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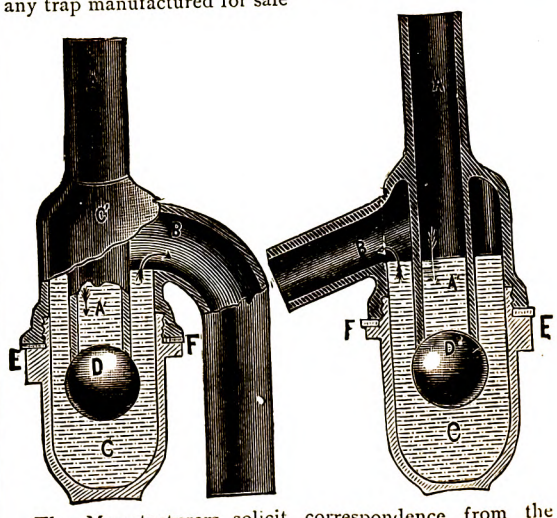

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Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

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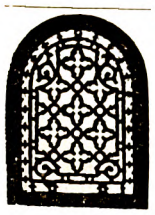

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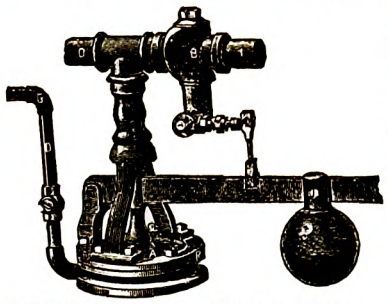

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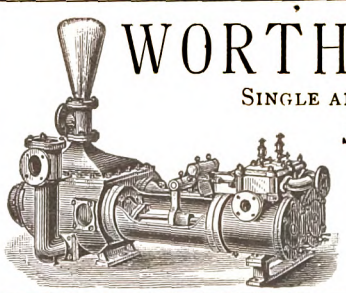

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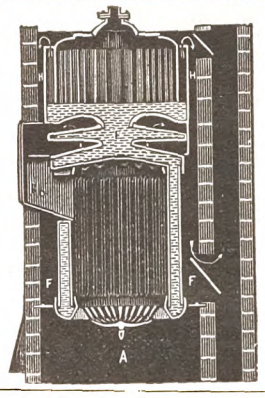

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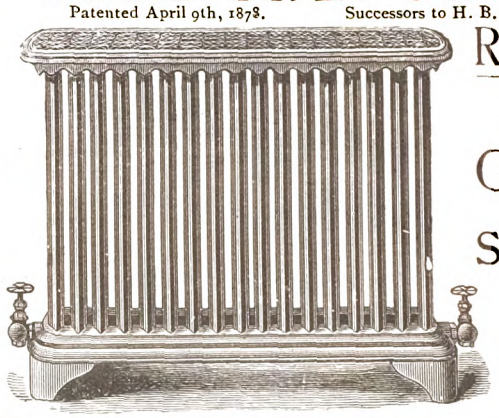

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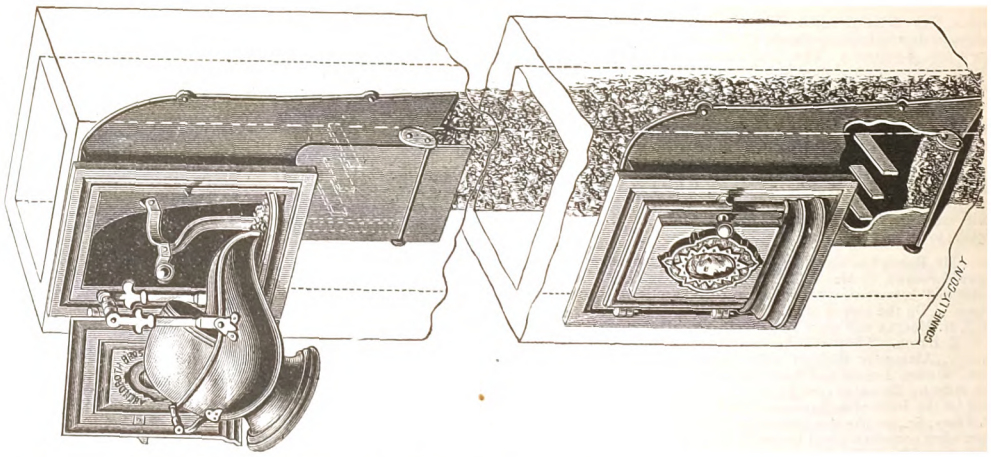

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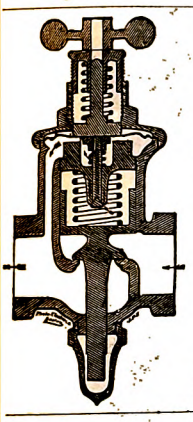

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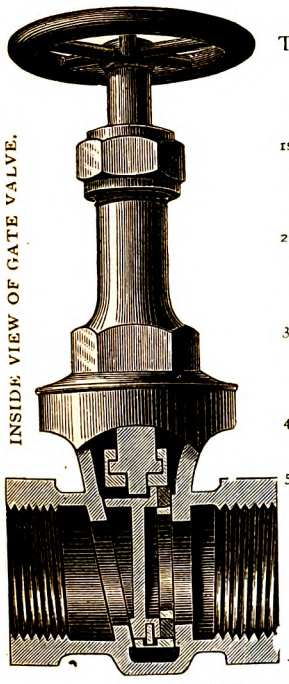

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The advantages these valves possess over all other gate valves, are—

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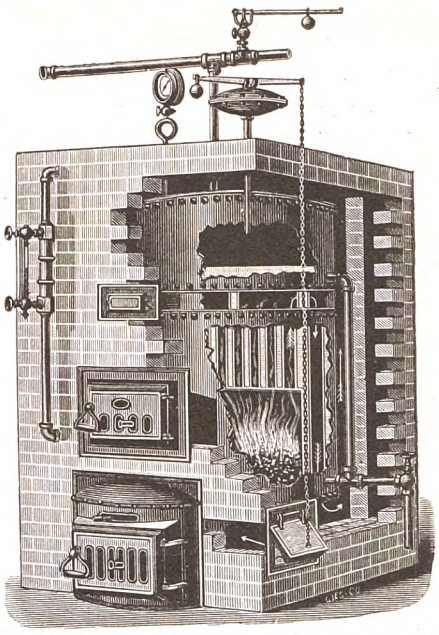

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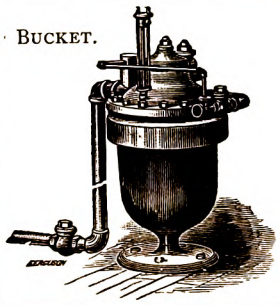

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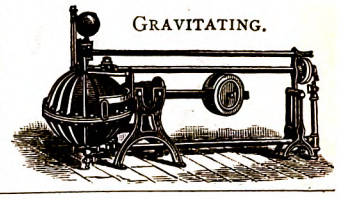

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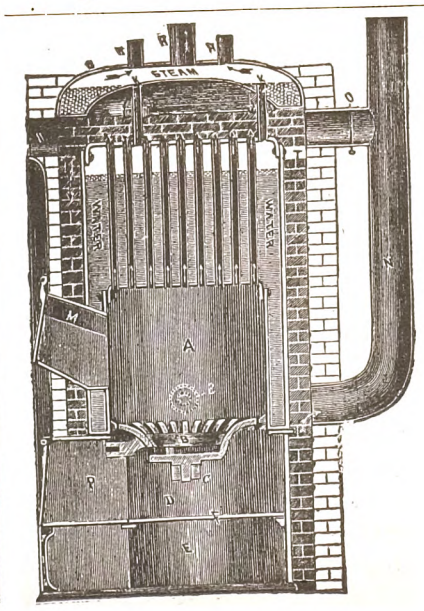

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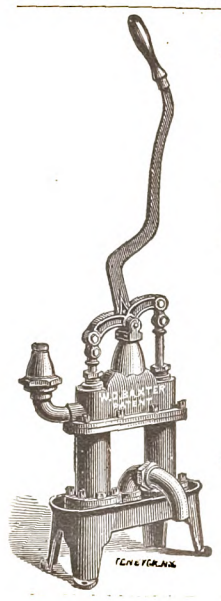

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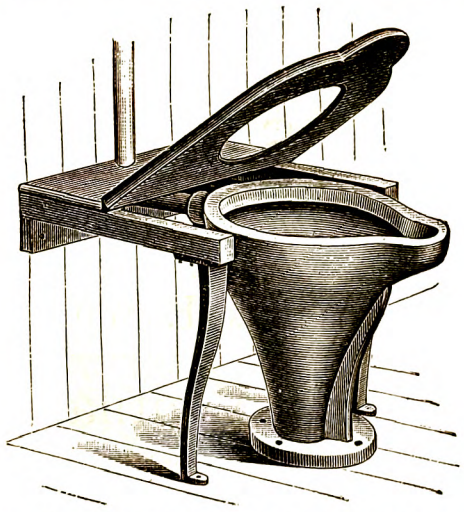

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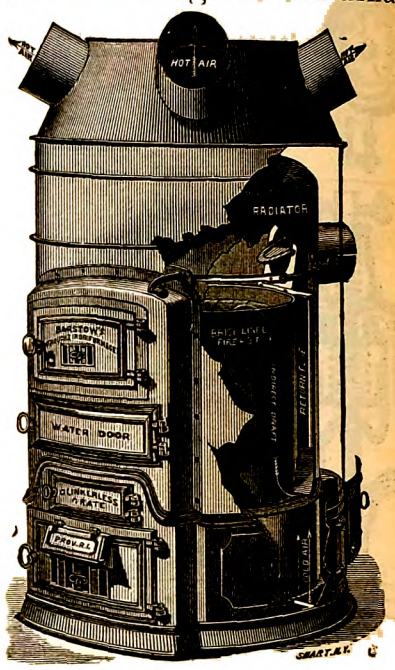

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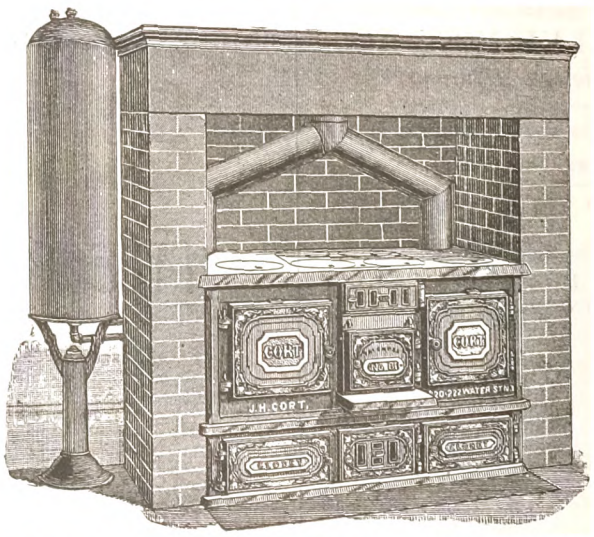

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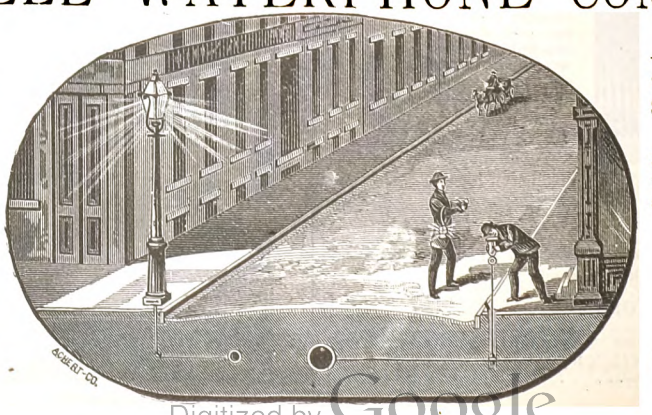

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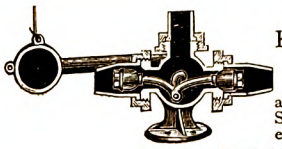

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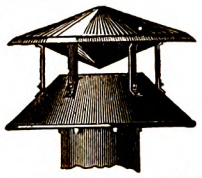

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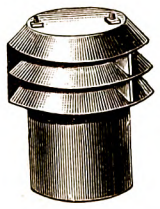

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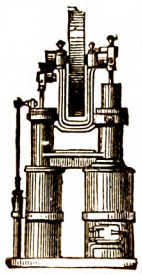

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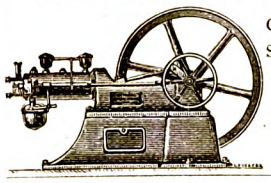

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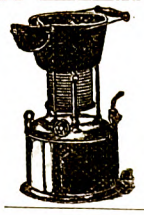

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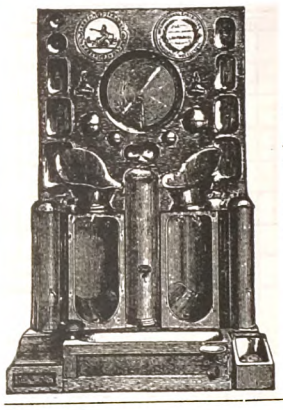

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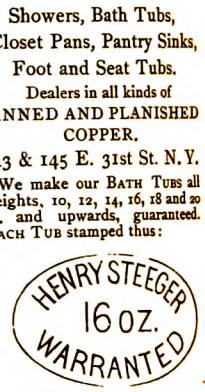

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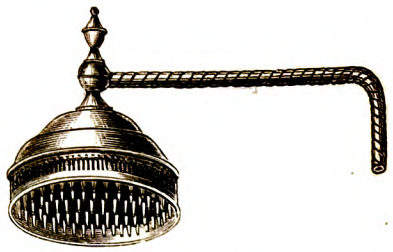

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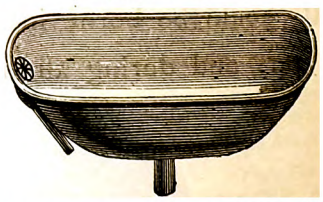

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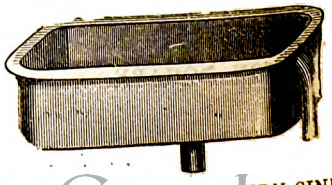

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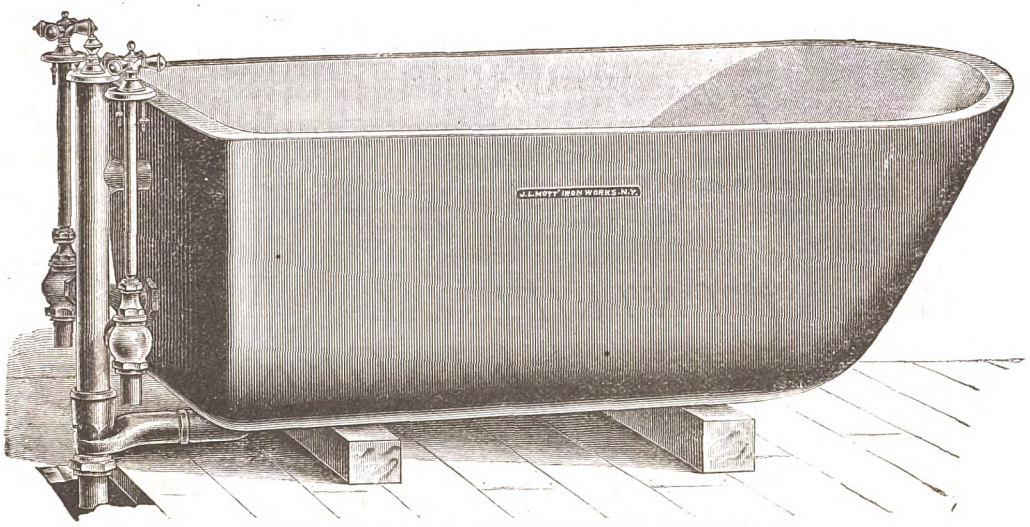

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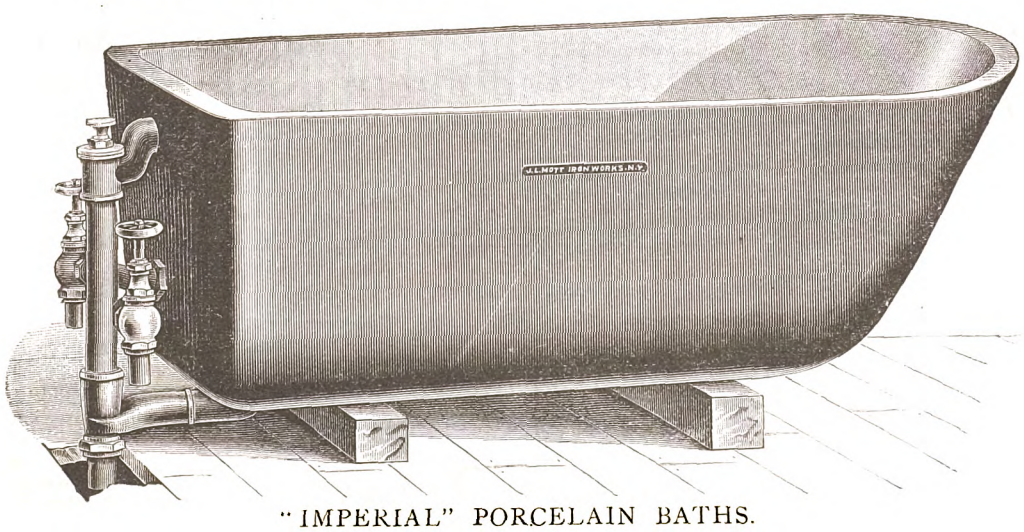

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THE UNITED STATES GOING INTO THE STREET CLEANING AND GARBAGE BUSINESS.

The New Orleans *Picayune*, of April 11, contains a long dispatch from Pensacola, from which it appears that an agreement has been entered into between the Board of Health of that city and Dr. Hamilton, the Surgeon General of the Marine Hospital Service, by which assistance is to be given to Pensacola, to effect and maintain the sanitation of the city, on the following terms:

"First in the payment of bills, for the removal of garbage during the months of May, June, July, August, September and October. The garbage shall be systematically collected and removed from every house and building or inclosure, under a contract made by the Board of Health, the contractors to give bonds satisfactory to the Board for the faithful performance of the work, and providing for liquidated damages, in case of failure.

"The bills for work done under these contracts to be certified by the Acting Assistant Surgeon of the Marine Hospital Service at this station, and the President or Secretary of the Board of Health. Contracts to be made for temporary drainage, and for the cleaning up of the principal streets. The drains to be opened, gutters made under the direction of the City Engineer and approved by the Board of Health. * * * The work to be paid for under like restrictions as under other contracts.

"All requisitions of the Board of Health to be forwarded through the representative of the Marine Hospital Service at this station."

It will be seen from this, that the Treasury Department proposes to enter on a new field of operations, and that of almost boundless extent. No doubt a large number of cities and villages, north, south, east and west, will be glad to have the United States pay their bills for removal of garbage, street cleaning, drainage and sewerage.

Under what law this contract to clean up Pensacola has been made we do not know, but we hope that its provisions are not going to be applied to that city alone; for if such should prove to be the case, it will be a matter requiring a good deal of explanation on the part of the Treasury Department.

THE RAMAPO PROJECT.

Two weeks ago we alluded to a plan proposed for bringing fifty millions of gallons of water daily to New York from the Ramapo River in Rockland County, and based our comments on the scheme on the proposition that the supply thus proposed was to be considered as a substitute for that recommended by the Chief and consulting engineers of the Department of Public Works.

The project has since assumed a different shape. It is now claimed that it is not intended to prevent the construction of the new Croton River Aqueduct, but only to furnish a moderate amount of water, about fifty per cent. of the present supply, but to furnish that in a much less time than it will take to build the Croton Aqueduct, and to deliver it at the city limits at such an elevation that it will furnish a means of protection against fires without the intervention of steam fire engines.

This places the matter on a different footing, and, in fact, presents the project in an attractive form to the gentlemen who have endorsed it.

The situation may be summed up as follows:

The underwriters and dry goods merchants want and demand a fire service for the protection of the dry goods district, so-called, said service to be provided at the earliest practicable moment, and to secure a constant pressure of water of at least one hundred pounds to the square inch, in order that stand pipes on the various buildings may be ready for any emergency, and that streams may be thrown directly from hydrants over the highest buildings without the aid of fire engines.

The committees from these interests endorse this Ramapo scheme, as presented to them by the engineer employed by its projectors.

They have been told, and evidently believe, that responsible capitalists stand ready to invest their money to carry it out, under conditions named in the bill elsewhere printed, and which they presume will be for the interest of the city to accept, yet not one of the chairmen of the various committees knows the name of a single one of these capitalists. They dread a devastating conflagration, since many of the buildings in this district are too high to be within reach of the present fire extinguishing facilities, and none of them are fire-proof; they are unable to secure adequate insurance on their stocks of valuable merchandise, and such as they have obtained might, in the event of a large fire, be valueless, since the insurance companies are likely to be bankrupted.

These gentlemen do not oppose the Croton scheme for general purposes, but on account of the time needed for its completion, and the fact that the head will not be above the level of the Central Park Reservoir. They want the Ramapo supply as an auxiliary, and they believe that project is put forward in good faith, is feasible, and can be carried out at reasonable cost, and within two years.

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It is, therefore, proper to consider the proposition in its various aspects, to see if the anticipations of these gentlemen have sufficient basis in fact, to offer a reasonable chance of realization. The reports which have been made on the subject heretofore do not appear to have been made by experts acting judicially, but rather by engineers acting as advocates. They bear to "the whole truth" the same relation that the evidence elicited by a competent lawyer from his own witness does. It is all true, no doubt; but there has been no cross examination to show how near to falsehood strict veracity can approach.

We wish to be understood as acknowledging the eminence in his profession of the only distinguished engineer who has appeared in advocacy of the scheme.

The proposition of the projectors of the Ramapo scheme—and it may be incidentally remarked that the names of its financial backers have never yet been made public—is to deliver a certain amount of water at the northerly boundary of the city, and to receive from the city for each million of gallons a price not to exceed the present cost of the same quantity of Croton water. This is apparently a fair proposition. It might be rather difficult, we imagine, for the contracting parties to agree on what the cost of delivering fifty millions of Croton water is. The city authorities might fairly claim that the repairs and maintenance of the aqueduct and dams outside of the city represents the cost of delivery of the water. This amounted in 1882 to $70,082, for 95,000,000 gallons a day, and therefore 50,000,000 gallons a day ought to be delivered for about $35,000, or the interest on $700,000 at 5 per cent. But the contractors might claim that as the city was paying $1,000,000 annually as interest on the Water Works debt, that one-half of that sum, or $500,000 per annum, should be paid them in addition to the $35,000. There would here be a good chance for honest difference of opinion, and consequent delay in furnishing water. The trouble recently experienced in San Francisco, over the settlement of the accounts between the water company and the city, is an illustration of the difficulty of adjusting such accounts.

Supposing the contract made, however, there should be some assurance of the ability of the contractors to deliver their water, since time is the important element in the consideration of this question of fire protection. The legislature would undoubtedly grant the company the power to condemn land and water rights under the right of eminent domain, so far as the State of New York is concerned. But the natural flow of the water from the 125 square miles of watershed draining into the Ramapo River in New York, is through the State of New Jersey. That State has a permanent commission, the duty of which is to guard the waters of the State, and the legislature has recently explicitly authorized and directed that commission to begin proceedings in the Supreme Court of the United States, in the name of the State of New Jersey, against any adjoining State which may attempt to divert water from the streams which enter and flow through New Jersey.

Litigation in the United States Courts on so important a question as this, would doubtless consume a great deal of time, and delay the advent of the Ramapo water.

But supposing the water delivered at the city line, there will be needed to make it available for fire protection of the buildings on Broadway alone, the laying of 16 miles of 30-inch pipe, which would take about 17,000 tons of cast iron and cost $1,000,000. This is the backbone only of the system of fire protection, for the Merchants' Committee of Fifteen demand that all the buildings in the present "Dry Goods District" should be connected with the separate fire mains. This would involve the tearing up of all these streets and the laying of about 12 miles of pipe. This, with the hydrants and branches, would cost another million of dollars, and if done within one year would cause great inconvenience.

To judge of the annoyance which would be caused by laying an independent set of mains through the business part of the city, we must bear in mind that the steam heating companies have laid only 14 miles of pipes altogether, and the fire protection of the business part of the city below Houston street would oblige the laying of at least 60 miles of pipe. To do this in two years would be very difficult and cause great interference with travel and traffic. It would, therefore, be interesting to know if it is proposed to lay these mains at once, or after the proposed supply is brought to the city limits.

The time assured for the completion of the Ramapo Works we believe to be ridiculously inadequate. The work contemplated is the construction of eight stone dams at the outlet of lakes, three earth dams, respectively ten, thirty and fifty feet high, 31 miles of aqueduct, of a design never, so far as we are aware, successfully put into use, and two lines of cast iron pipes, each a mile long, sunk at the bottom of the Hudson River.

It is not our purpose to assert that the engineering difficulties are insurmountable, but we do assert that they are sufficiently great to require that the pecuniary rewards held out must be large in order to secure the investment of the necessary capital to insure the delivery of the water at Mount St. Vincent.

As for the claims made of the superior quality of the water to that derived from the Croton, they are silly. They sound well and may be useful in arousing a sentiment, but they are untrue. The population of the upper part of the Croton watershed, over twice the available area of the Ramapo, is no greater to the square mile, and the soil is as rugged and favorable to purity of the water.

The advantages of the project may be allowed to be (1) independence of source, (2) practicability of a fire service. Its questionable points are (1) lack of responsible backers who are willing to give their names; (2) doubt of the legal possibility of its being carried out; (3) hazardous methods of construction; (4) excessive cost, the water delivered being claimed to cost $6,000,000 for 50 million gallons per day. At the same rate, the new Croton dam and aqueduct, which will deliver 250,000,000 gallons per day, would cost $30,000,000, which is twice the greatest estimate of its projectors.

In view of the considerations here suggested, and others that the limits of this article forbid our mentioning, we should want the Treanor bill so amended that the Sinking Fund Commission shall not be limited to the consideration and negotiation of this particular scheme, but empowered to employ their own experts to suggest a scheme for fire protection, on which they can obtain opinions from disinterested experts and have carried out as they deem best. We have no desire to retard the execution of any reasonable, practicable plan that will secure prompt fire protection for the dry goods district that we are satisfied is put forward in good faith, but we are unwilling to endorse any scheme the backers of which keep themselves so carefully out of sight. Since the entire amount of water consumed for fire extinguishing purposes was only 47,418,250 gallons during 1882, about one-half of one day's supply, and since special fire mains must be laid with any high service scheme, it might be well to have the opinion of experts as to the feasibility of keeping water in these special mains under sufficient pressure to offer the Fire Department all the relief they want so far as water is concerned, and yet not use salt water, or cross the river for a supply either.

The questions for immediate consideration, it strikes us, are—

First. Shall this city go to the expense of putting down a system of special fire mains from which water for no other purpose is to be drawn, and if so, to what extent? and

Second. Cannot a constant pressure of 100 pounds per square inch be maintained in such mains at less expense than by the purchase from private parties of futures in water?

HEATING AND VENTILATING A PRISON.

The accompanying diagrams illustrate the principles of the warming and ventilating of the New York State Reformatory at Elmira, N. Y.

Figure 2 is a cross section of one of the wings of the building, showing a "cell block," of which there are four, with the arrangement of the air passages and course of the air from the time it enters fresh at the window *a*, until it escapes through the exhaust chamber *c*. Figure 1 is the detail of the radiators, which present some novel features.

In prisons the problem of efficiently warming and ventilating is complicated by the necessity of providing for the safe keeping of the inmates, and calls for methods not ordinarily met with and of unusual strength.

The heaters are round, vertical tube radiators set under the windows, with openings in the centre of the bases. In corresponding openings in the stone flags are set strong cast iron pipes *t*, with flanges built into the masonry. These pipes extend up through the openings in the bases of the radiators which they fit closely, connecting the fresh air ducts with the radiators and preventing water (when washing the floors) from entering the ducts. The upper end of the pipe *t* is also fitted with a strong plate *f*, which acts as a baffle to the entering air, forcing it between the tubes of the heater, and also acts as a cover to the pipe, so that nothing large can be passed through it.

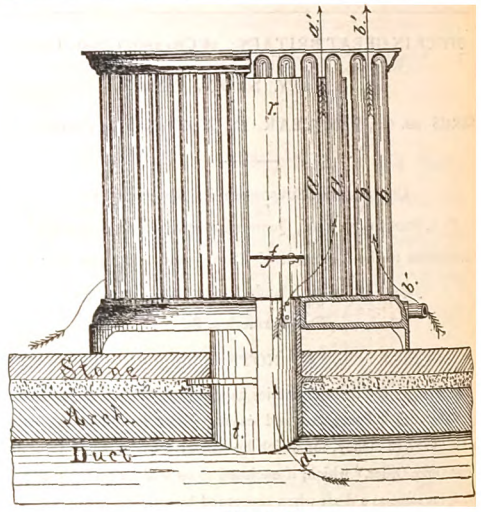

FIGURE 1.

The number of concentric rows of tubes in the radiators is four. The two outer rows are separated from the inner ones by a galvanized sheet iron partition or septum *r*, the object being to divide the inside rows from the outer ones so as to make part of each radiator practically an indirect heater, the air from the duct only coming in contact with the inner rows, while the outer rows warm the air already within the halls and give direct radiation.

The galvanized sheet iron partition is simply a sheet of No. 20 iron, bent and riveted at the edge and slipped into place, and may be done with any round radiator, making what is called a "direct-indirect-radiator."

It is claimed that the short shaft or flue formed by this simple device accelerates the movement of the air to a very considerable degree, and prevents the possibility of the air being drawn down into the duct by preventing a reversal of the movement of the air in the towers.

With radiators arranged this way, we are informed, marble tops are not as good as cast iron fretwork, as the former hinders the easy ascent of the current of air; and we believe for all purposes the marble top does not give quite as high an efficiency for the same reason.

There are 500 cells, each of which have two 4x4 inch flues, one from near the ceiling and the other from a cast-iron niche near the floor. The one near the ceiling is fitted with a heavy cast-iron frame built into the walls, while the lower one connects with the top of the "night-bucket" niche. The flues are separate their whole

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ength, each terminating in the exhaust chamber as shown, and there is no means of closing them.

The exhaust chambers extend the whole length of the blocks of cells, so that the flues are perfectly straight, a person in the chamber being able to see the light in the cells.

The steam coils within the exhaust chambers are 1¼-inch pipes and extend over the upper ends of all the flues.

The air ducts extend all around the wings near the outer walls as shown, and communicate with the fresh air shafts or towers, each tower having a separate section of duct.

The course of the fresh air is in at the window and down through the tower, thence through the air ducts to the radiators, through which it passes to the halls, from which it is drawn into the cells by the action of the independent flues, thence out through the aspirator.

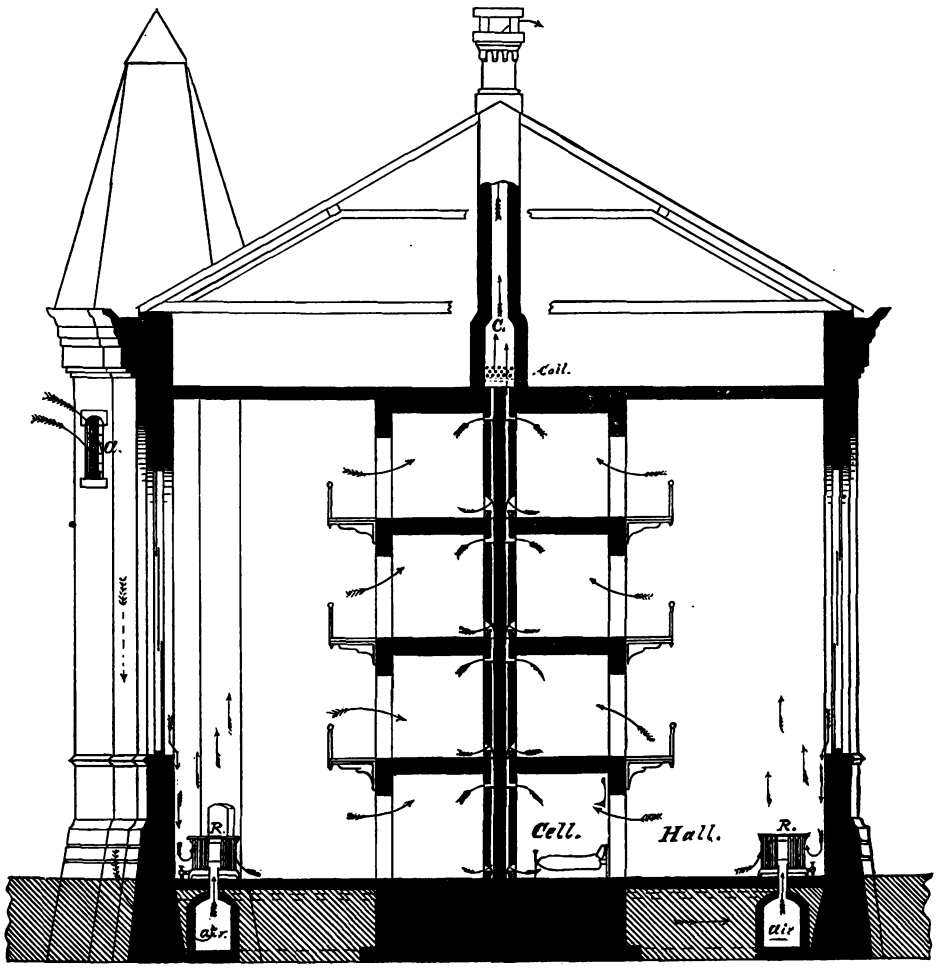

FIGURE 2.

The coils in the aspirator or exhaust chamber are not connected with the regular heating system of steam pipes, but with a special system provided for them, with the valves in the boiler room, so that they can be under the control of the engineer without his entering the buildings, and also to admit of using the exhaust chamber and coils during the summer and when steam is not otherwise required, which is done, causing a rapid movement at all seasons.

We are informed that when the air is moved sufficiently often to give each cell one-half a cubic foot of air per second, the difference of temperature between the upper galleries and the flag is only five degrees in the coldest weather.

The system of steam pipes is "gravity-return," and the pressure is increased or decreased to suit the weather.

The boilers are ordinary horizontal tubular, five in number, 16 feet long by 4 feet in diameter. Two, and sometimes three, are used on the heating apparatus, and one for cooking, drying, etc., while one is always in reserve.

We are indebted to Z. R. Brockway, General Superintendent of the prison, under whose supervision the institution was built, for the drawing of the building.

THE SEWERAGE OF BINGHAMTON.

The following is the reply of Mr Rudolph Hering, C.E., to the strictures which Col. George E. Waring made on the plan proposed by the former for the sewerage of Binghamton, which we published in our last issue:

To the Honorable Common Council of the City of Binghamton, N. Y.:

GENTLEMEN—I have recently received, in pamphlet form, a letter written by Colonel George E. Waring, Jr., to the Citizens' Committee of your city, for which he had prepared a report on a system of sewerage for Binghamton, about the same time that I submittted a similar report to you. In this letter he comments on my recommendations.

Unwillingly I send you a reply to it, because an apparent controversy of this kind might possibly lead you to infer that there was still a serious doubt as to the proper methods of sewerage. But as he states that the system I have submitted to you, and which you have adopted, is "very crude, imperfect and unsatisfactory," my duty to you, as well as to myself, demands this communication.

I can probably justify my recommendations in no better way than to compare them with those offered by him to the Citizens' Committee, which will, I think, assure you that this statement has no foundation.

On the day that I submitted my plan and report, I was shown the plan of Colonel Waring, which had been presented a short time before. I felt some astonishment on seeing it, as I had expected one that was much better digested. Among the main lines, he had drawn several, naturally suggesting themselves at first, which after a more careful inquiry were found less desirable than others not so apparent at once. It was precisely a study of this kind which I supposed you expected of a consulting engineer, instead of a scheme of alignment, which would later be found less advantageous.

You will find, for instance, that the drainage of the northern part of the city can be better accomplished by carrying the sewage eastward to Liberty street than westward to the canal. You will also find the location of the First Ward main sewer, as I give it, to be less expensive, and to give a better point of discharge than Col. Waring's route. The reasons which decided in my mind with regard to the selection of these lines are given in my report.

But I was still more surprised when seeing a prominent, curved line indicating the boundary of Col. Waring's plan. It encloses only the higher areas, from which very readily all sewage and rain water could run away to the river, and excludes, by curving around them, the lower areas, which present the only difficulties in this respect to be met in your city. They are within the populated districts, and, as you know, give you much more trouble than the high grounds. In these places, which form natural pockets, the rain and waste water produce small ponds in wet weather, and at other times deposits of stagnating sewage. The depression on Pine street is even well built up, and inhabited by the poorer classes, needing drainage as much as, if not more, than the inhabitants of the high ground.

Nearly all of the time I consumed in studying up my plan was devoted to these very difficulties, which to you were most important, and which Colonel Waring has not solved, while he has shown you only how the sewage will flow from the higher territory down to the rivers.

Further, he would have you abandon most of the sewers already built, and construct new ones on the same streets and about of the same depth, for the conveyance of sewage only. In my plan all existing sewers that are in a good condition have been worked into the system to the best advantage.

I was, therefore, impressed with a feeling which Colonel Waring has expressed in words with reference to my plan, namely, that his project was certainly "very crude, imperfect and unsatisfactory."

He says nothing in his letter about the above, and other essential points, but confines himself almost wholly to generalities, to which I will next refer.

From the summer of 1880 to that of 1881, I was engaged in studying the features of the sewerage works of Europe for the National Board of Health, Washington. My instructions were to carefully examine and report on facts, and the time I spent on this work allowed of a very thorough inquiry, the importance of which I fully realized. The Memphis works had just been finished. Claims were being urged for and against them. I had no preference for nor interest in any particular system, further than to find out which, if any, was the best.

The results of my labors are embodied in a lengthy report to that Board, and the general conclusion, which very clearly impressed itself upon my mind, was that no one system was *per se* the best, and that the locality should govern the selection, as most of the systems in use were good under specific conditions.

Had the locality of your city made it apparent that Colonel Waring's patented claims were the best, I should not have hesitated in the least to recommend them to you, with perhaps some modifications. But I am convinced that they are not the best, and would even be less useful and satisfactory in your town than in most of the towns I have recently reported for, and in none of which I found occasion to recommend his patents.

A main feature of his system is the absolute exclusion of rain-water. I stated fully in my report, page 3, the reasons for admitting some roof-water in all cases, to which I must again refer. To further justify this point, I will add the following:

Baldwin Latham, in his standard work on Sanitary Engineering, says, page 42 (Ed. 1878, or three years before the issue of Waring's patent): "Some persons propose that in every district the rainfall should be entirely separated from the sewers; but, unfortunately, the persons who make this proposition have had, as a rule, a very limited experience as to the effects of rainfall on sewers." He says further, page 299: "The admittance of rainfall is of considerable value as a flushing agent."

This is about the opinion held by the most prominent municipal and sewerage engineers, as I found it expressed during my extended visit abroad, and as it is expressed also in our own country. At the last annual meeting of the Association of Municipal and Sanitary Engineers of England, in the summer of 1882, in the president's address we read: "A theory more opposed to the first principles of sanitation (the absolute exclusion of rain-water from a public sewer) I can hardly conceive of; for strongly as I am in favor of that which we know as the separate system, * * * * I know of nothing which tends more to the purificationof the immense quantities of lateral drains * * * * * than the heavy flush of rain, which dealing with drains over which the local surveyor has no control, carries on a purifying process which no mechanical flushing can by any

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possibility produce." In the discussion which followed, this opinion was generally endorsed. One speaker stated: "I was exceedingly pleased to find that he (the president) gave very good reasons for a single (combined) system of sewers to a certain extent." It was further said: "The growing tendency of modern times, principally in the south of England, is to the separate system—absolute as far as possible. I believe that those having practical duties to carry out as town surveyors, will agree that the value of rain-water in cleansing the drains is very great, and should not be thrown away."

Robert Rawlinson, Chief Engineer of the Local Government Board, and highest English authority on sewerage matters, in a letter to THE SANITARY ENGINEER, New York, April 27, 1882, "insists on the removal of roof water" as being beneficial for the sewers.

You see, therefore, that my recommendation to admit some roof water is supported by excellent authority; in fact, more weighty authority of its kind does not exist. On the other hand, the Memphis system has been in use hardly three years. In has already required the introduction of a number of man and lamp-holes for the purpose of cleaning, and already some of the mains are running at times up to their full capacity. Had the mains been made larger, and the means for access been placed in a manner, as a long English experience shows advisable, the system would have been still more satisfactory.

A regulation of the amount of rain water entering the sewers is not a difficult thing, and no such evil effects as Colonel Waring mentions will occur under ordinary careful control.

If it is said that we have less frequent rainfalls here than in England, and, therefore, can less depend on their flushing, I must reply that this changes their value in degree only not in fact. Additional artificial flushing is necessary in England; it would also be necessary in our country, and perhaps to some greater extent.

I must here refer to the case which Colonel Waring had calculated for a small district in New York in a way which might tend somewhat to mislead. Had he not left out the cost of excavation, back filling and repaving, the example would look differently. At a low estimate these items would cost 75 cents per foot, for each plan, "not considering the extra cost of the wider trenches for the larger pipes," which would be a trifle, if there was any difference at all. This gives the cost of sewers, excluding roof and yard water, to be about $3,120, and including it about $4,600, as against $900 and $2,377 respectively, the figures given by him.

While in the latter case it might appear that it costs about 163 per cent. more, in reality the reception of roof and yard water would cost only 47 per cent. more. Further, he calculates a greater roof and yard area than I have done in your case, because New York is built up more densely, which fact would likewise tend to mislead. The entire quantity of roof and yard water is beneficial, mainly at the highest part of the sewer, and of the drainage area; lower down much of it could as well run off in the gutters. As a matter of fact the saving of expense by excluding the roof water in a city like yours would be less than 25 per cent. the cost required to include it.

But you would lose the advantages of the inhabitants freeing their yards and the sidewalks of much ice in winter and of much rain water in summer. In a rural section of Cleveland, Ohio, sewers were built solely for the purpose of carrying away rain water from the lots, showing that this advantage is deemed to be worth considerable expense.

You would further deprive the sewers of a large amount of clean water for flushing. And I might add here that, on account of the simultaneous entrance of the rain water over the entire system, the *mains* are flushed by a much greater quantity than is ever possible by the dissimultaneous action of flush tanks alone.

The somewhat larger pipes, finally, will allow for extraordinary demands, as well as for temporary expansion of the district, and decrease the danger of serious stoppages.

All these advantages are gained to property owners and the city, for the additional expense of but a few dollars per average lot at the time of building the sewers. Virtually, however, there is no such additional expense in the system I have recommended to you, because by building also *separate* channels for rain water removal in the "Waring" system, the total cost to the city would be no less, but rather more, both for construction and maintenence, than for single sewers. When Colonel Waring says that my "system is very costly," wishing you to infer that his costs much less, you can now perhaps readily see the weight of his assertion.

Another main feature of his system is the placing of automatic flush tanks at the head of every sewer. He says, page 12: "Even if we admit the full benefit gained (of receiving roof water for flushing), what shall we say of the condition of such sewers depending on this means of flushing alone?" leading you to infer that I have provided for no other means of cleansing. I distinctly recommend, page 10 of my report, the use of automatic flush tanks at dead ends, where the flow is slight, as I have always done before in other cities.

A third feature of his system is a sub-soil drainage. You will find that I have recommended the same method (page 10).

A fourth feature is the ventilation of the sewers through private houses. This I could only advise if the control of the house sewers is placed in the hands of competent persons under municipal control, but not if householders and plumbers alone have sole charge of them, (page 10, second column), as there would be great danger of sewer air getting into the rooms.

These four points are the main claims of Col. Waring's patent, which has the date of January 18, 1881. He leads you to suppose that they were all or in part new, and that their use subjected you to the payment of a royalty.

The idea of an absolute exclusion of rain water is old. It had been carried out before, where it was thought advisable. Robert Rawlinson says, page 16 of his "Suggestions," 1878, adopted by most of the English towns: "Where sewage requires to be pumped, it will be advisable to exclude surface water." Baldwin Latham says, page 50 of the work above quoted: "When sewage is intended to be treated (purified before entering a small water course), rainfall should be excluded as far as possible. In some foreign countries in which there are distinct periods of wet and drought, it may always be desirable to convey away the excessive storm water by a distinct set of sewers, while the sewage proper may be conveyed away by another set of sewers." The city of Oxford has had for five or six years a small district in which no rain whatever enters its sewers.

From this fact and the above quotations you will see that it is not so much the "English law" that prevents exclusion of rain-water, which could be changed by the Local Government Board, if it were necessary, but the opinion of engineers that it is advisable only under specia conditions.

In Germany the entire exclusion has been recommended for a part of Elberfeld and Barmen. But even in our own country, the town of Pullman, Ill., has a complete system of sewers into which no rain-water enters. Colonel Waring can therefore claim no royalty for this feature alone.

The idea of placing automatic flush tanks at the heads of sewers is also old and has been used for several years. Bailey Denton, in his large work on Sanitary Engineering, 1877, says, page 201 and others: "At the head of all sewers there should be some means provided for admitting water, either from the public water-main or from a tank built purposely to collect the rainfall and retain it for use in flushi g during dry weather;" "Field's flush tank may be used for this purpose;" "By the use of tanks of this character the rain water from the roofs may also be turned to account for flushing, and as it is only when the tank becomes full that its contents are discharged, the slightest showers are made to contribute."

Baldwin Latham, in the text book before quoted, 1878, says, page 293: "For flushing the heads of sewers, tanks are usually provided, the contents of which are periodically discharged by means of a self-acting syphon, a plug or valve." He further says: "When used for this purpose (flushing 'either large or small' sewers), the *annular form of Field's syphon* is generally desirable," which is the same one embodied in Waring's patent, dated three years later.

But also in our own country automatic flush tanks have been recommended prior to 1881. In Pullman there is one at the head of every branch.

Also the claim of combining a sub-soil drainage with sewerage is old. Several European cities have done this in part years ago. And as to the ventilation of the sewers through house pipes, I will state that this has been for many years the common custom in Germany, where house drainage was directly under municipal control.

I shall now refer to some special points gathered from Col. Waring's letter.

He passes over the question of rain water removal lightly, as though it were simple and inexpensive, while in reality it is quite a troublesome feature. These "few channels," which he admits will be required for this purpose, can hardly be less in number and size than those I have provided for in my plan, as I have not advised its underground removal, except at such points where its surface flow will become objectionable, which applies equally to both systems. The difference is, that I have embodied the rain water removal in mine, while he has made no design for it.

He claims that catch-basins would be an "intolerable nuisance in paved streets," from which "much horse manure and other filth" is deposited in them. If this were true, and it can only be the case under bad management, whereas it is not true in cities under even a tolerably good one, the same argument would apply to the shallow channels which he advises for the removal of street water alone, and into which the same surface filth would be washed and deposited. Such rain water channels I occasionally found in Europe to be no less foul than sewers.

When he continues to say that the attention and labor required to keep them clean will be as "nothing" compared with what would be demanded by those contained in my plan, he contradicts English experience.

In asserting the opinion that short curves within manholes for pipe sewers, and long curves for large sewers, do not respectively offer the greatest advantages, he stands in opposition to the emphatic assertions to the contrary made by and insisted upon by the best English engineers and others, even under conditions of a regular flushing of sewers.

Baldwin Latham says, in his text book, page 163: "The system of laying sewers in straight lines, with man-holes, lamp-holes, or ventilators at every point of change in direction, and which is so great an improvement on the old system of laying sewers in crooked (curved) lines, is due to the ingenuity and forethought of Mr. Robert Rawlinson, C. B., Chief Engineer of the Local Government Board."

Colonel Waring asserts further that sewers receiving rain-water together with sewage are always foul, and that such sewers are "never" as good on sanitary grounds as two separate sewers.

My examination of sewers did not prove this to me. On the contrary, the best systems in Europe and the cleanest sewers I saw happened to be of the "combined" class; and in the cities where they were properly designed, the death rate was lower than before sewers were introduced.

I must emphatically differ with him as to the correctness of the statement, that the storm water overflows into the rivers would be "seriously objectionable," because during the first part of a rain, most of the sewage in the pipes is flushed rapidly to the outfall, and the remaining quantity is greatly diluted before any part of it flows over into the river; and because, secondly, I have myself repeatedly observed the action of such overflows, and, learning also from others who had a more frequent opportunity to do the same, feel safe in asserting that experience does not substantiate the objection, whenever the works were properly designed.

I think the foregoing discussion will satisfy you, that not only the special features of my plan, but also the general ones compared with those recommended by Col. Waring in no way justify his remark that they are "very crude, imperfect and unsatisfactory." On the contrary, it would seem, if the remark can apply to either, that it applies with some force to his own plan.

First, on account of his ignoring the essential question of rain-water removal in general, and 2nd, from the most troubled sections of your city in particular; 3d, from an insufficient study into the alignments for the First Ward main sewer, and 4th, for the removal of the sewage from the extreme northern part of the city; 5th, from the abandonment of some of the best sewers for the purpose they have been heretofore satisfactorily used; 6th, from a less perfect design in the alignment of pipe sewers.

The best modern works upon which my designs have been based, are successful and satisfactory; and the principles recommended to you are held, as I have shown, by most eminent engineers. They are further justified, in my own mind, by a careful study into these questions and of many executed works.

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Whatever success there has been with the Memphis sewerage is without doubt due solely to the several principles given above, which have been known to the world and practiced for some time. Those which, in my opinion, were advisable for your town, I have recommended to you, the others I have not.

The special note printed by Col. Waring, on the cover of his letter, giving an extract from the Memphis *Ledger*, in which is said that the people of that town would not sell the "Waring Sewerage System" for a million dollars, shows plainly that the long existence of the Separate System in England could not have been known to this editor.

I beg leave, in closing my communication, to quote from an editorial of another paper — THE SANITARY ENGINEER of New York—among periodicals probably the best authority on such questions in the world (September 14th, 1882): "It is unfortunate that the separation of sewage and rain-water in town wastes has been developed into a "system," and as such been treated in a commercial rather than engineering spirit." "An old established and much used method of procedure may be taken up by some shrewd person and widely and enthusiastically advertised and puffed and proclaimed to be a panacea." "Inexperienced engineers and amateurs outdo their preceptors in invectives against any application of the fundamental principles of civil engineering, viz., the application of common sense and science and experience to the solution of problems of construction." "Professional men who have minds of their own adopt what extremists on each side sneer at as a compromise, but which is really a wise, 'natural selection.'"

Yours respectfully,
RUDOLPH HERING,
18 Tribune Building, N. Y. City.

March 31, 1883.

PLUMBING IN A WEST-SIDE HARLEM RESIDENCE.

The portion of this city just north of 125th street, west of Fifth avenue, is being rapidly built up in apartment houses, flats and private residences, which are being occupied mostly by the more cultivated people of moderate

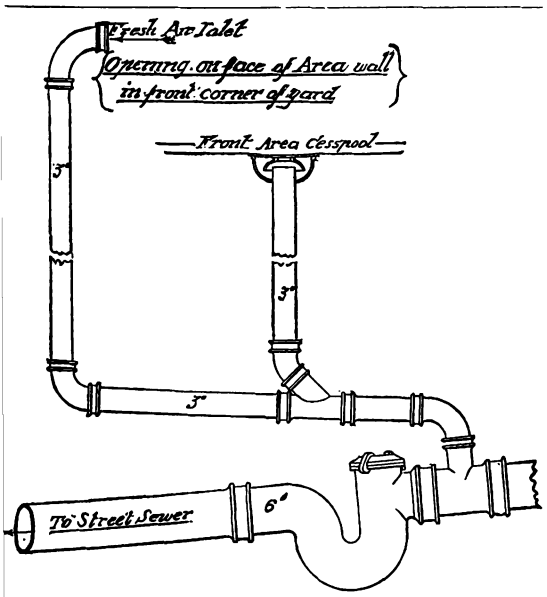

Figure 1.

means. The Inspector of the Board of Health for that district informs us that the plumbing of these houses is generally well done, and in accordance with the plumbing regulations; he has occasion to report but few violations, and very seldom any of a serious character. The most expensive class of plumbing, such as our descriptions have been mostly confined to heretofore, is not to be looked for in this district. The new residence of Mr. William H. Arnott, 122 West 126th street, contains, however, some very good work, done by Mr. Cauldwell Fraser. The following description of some of the more novel and interesting features may be of interest.

The method of draining the front area through the fresh-air inlet is shown in Figure 1. The connections with the area cesspool (which has a bell trap) and the air inlet are each 3-inch. The latter opens in the face of the wall of the front steps, near the front corner of the area, about ten feet from the wall of the house, and a foot above the area surface. The mouth is open and unobstructed by any plate, cap or gauze. The house drain is of extra heavy iron, six inches in diameter. For about half its length it is under the concrete cellar floor, resting on the earth, and the rear half is fastened to the cellar wall, having a grade of about one in fifteen. It was at first designed to run it all the way through the house above the ground in this manner, but as it would have interfered with the cellar stairs, it was turned down into the ground at an angle of about 60° with the horizontal just before reaching them.

Fig. 2. shows the connection of the refrigerator waste with the 6-inch house drain, or rather the method of discharging the water from the ice-box into the drain—there is no direct connection. The zinc waste pipe from the refrigerator projects an inch or two below the cellar ceiling; over this is slipped loosely a lead pipe, strapped to the wall and ending a few inches above the open end of an enlarged extension of the S-trap just above the drain. As ice is kept in the refrigerator the year round, this trap is expected to be always full.

All the other fixtures of the basement have their traps below the floor in the cellar, as shown in Fig. 3. The trap

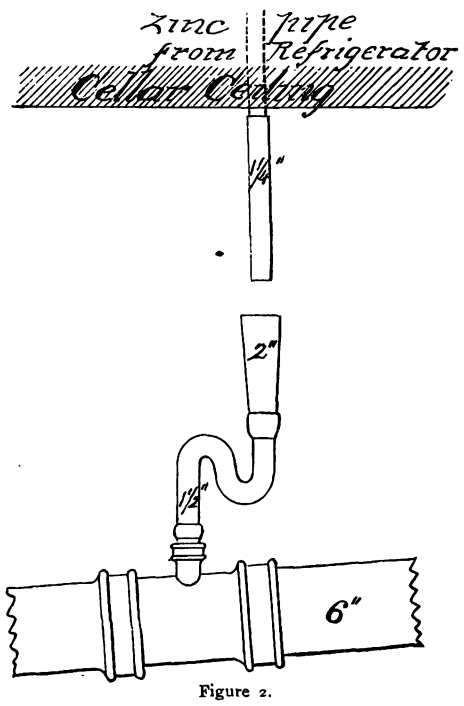

Figure 2.

there represented is on the waste pipe from a servants' hopper closet which is situated in a narrow room beside the passage way to the back door and entered only from the yard. The air pipe for the traps is half concealed in the ceiling, as shown; just beyond the last inlet from the fixtures the house drain is reduced to 4-inch, which takes a 4-inch rain leader on the outside of the wall, trapped underground. A 3-inch connection from the back area cesspool, enters the rain leader trap below the water-line, and is also trapped again just outside the cesspool.

The water closets and baths on the upper floors are set on platforms raised six or seven inches above the floor to

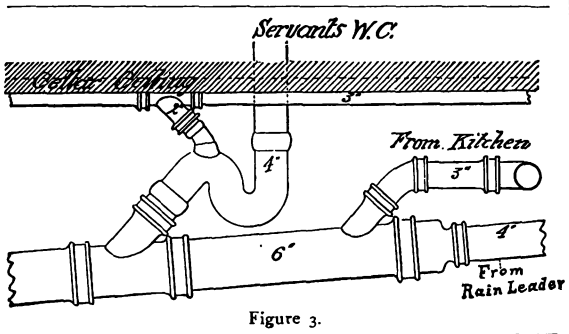

Figure 3.

give room for the traps. The closets are of the plunger type and are glass lined. The bathing troughs in an aviary on the fourth floor are all connected by running full size through the cage divisions, and have a single standing overflow discharging into the 3 inch line of bath tub waste-pipe, after passing a half-S trap. All the waste pipes are in recesses in the wall, covered by wooden panels fastened with screws. The safe wastes have open ends just under the cellar ceiling. The following is a summary of the fixtures: Three water closets, two baths, nine basins, three wash tubs (having a single trap), one kitchen, one butler's pantry and one slop sink.

AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.*

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

(Continued from page 436.)

Couplings.—The internal threads in the sockets or fittings, by which the tubes are connected together, require the same accuracy of workmanship as the external threads on the tube ends. In practice it is found that the straight couplings or sockets, connecting tubes in the same straight line, may be made of wrought iron, and may be tapped parallel instead of taper; they are sized to screw freely upon the small extremity of the tapering tube-end up to as far as half the length of the perfect thread on the tube; and they then become stretched by the force exerted in screwing them upon the remaining half length of larger diameter, and form their own taper to fit the tube. To allow for clearance between the ends of the two tubes united by the coupling socket, the length of the coupling is made as nearly 2½ times the length of the perfect-threaded tube-end as will suit the width of iron from which the coupling is manufactured. The minimum thicknesses of metal for the several sizes of couplings previous to tapping are given in Table III., with their corresponding diameters and lengths.

TABLE III.

Dimensions of Straight Sockets for Coupling Wrought-Iron Tubes.

Diameter of Tube.		Diameter of Socket before tapping.		Thickness of Socket before tapping.		Length of Socket.
Nom'l Inside.	Actual Outside	Outside.	Inside.	Actual.	Birmingham Wire Gauge.	
Inches.	Inches.	Inches.	Inches.	Inch.	No.	Inches.
⅛	0.405	0.551	0.333	0.109	12	* ⅞
¼	0.540	0.699	0.431	0.134	10	1
⅜	0.675	0.834	0.566	0.134	10	1
½	0.840	1.011	0.699	0.156	8½	1 5-16
¾	1.050	1.239	0 909	0.165	8	1 3/16
1	1.315	1.527	1.143	0.192	6⅛	1¾
1¼	1.660	1.893	1.487	0 203	6	1½
1½	1.900	2.166	1.726	0.220	5	*2
2	2.375	2 677	2.201	0 238	4	*2¼
2½	2.875	3.190	2.622	0 284	2	2¾
3	3.500	3.870	3.245	0.313	..	3
3½	4.000	4.404	3 724	0.340	0	3⅛
4	4.500	4.992	4.242	0.375	00	3¼
4½	5.000	5.491	4.741	0.375	00	3⅜
5	5.563	6.186	5.311	0 438	..	3½
6	6.625	7.236	6.361	0.438	..	3¾
7	7.625	8 358	7.358	0.500	..	4
8	8.625	9.489	8.364	0.563	..	4¼
9	9.688	10.539	9.414	0.563	..	4½
10	10.750	11.720	10.470	0.625	..	5

*The three lengths marked by an asterisk are increased disproportionately for appearance.

This parallel tapping is not altogether satisfactory for the straight couplings for tubes above 2½ or 3 inches nominal diameter, and the joints so made are not reliable if screwed up with the ordinary tongs; for elbows or tees the method is very unsatisfactory. Tapering threads are usual in the wrought-iron sockets for the "oil-tubing" in petroleum wells, and for the "line pipe" through which the petroleum is conveyed; these tubes range from 5 to 10 inches in diameter, and are subjected to pressures of 1,200 to 1,600 lbs. per square inch; the tubes themselves are frequently burst by the pressures exceeding those, but the joints are perfectly reliable and unyielding. In the original construction of taper joints by Mr. Joseph Nason, the sockets of all sizes were made taper; the subsequent departure from this practice was a matter of cheapness in manufacture, and has never been a mechanical success.

The great power required for tapping a tapering thread in wrought-iron, and the extra cost of making wrought-iron elbows and tees, etc., have led to the employment of cast iron as the material for the fittings or couplings. Careful study having been bestowed upon the reduction of the material to the smallest quantity requisite, and upon the production of the cored castings with the least amount of preparatory work, these cast-iron fittings have now become universal for all joints of wrought-iron tubes, excepting only the straight couplings already mentioned. The scale drawn one-quarter full size in Fig. 2 gives the exact dimensions for all parts of every possible elbow, tee, cross, or branch, for tubes of ⅛ inch up to 8 inches nominal inside diameter. With these dimensions the least quantity of material, consistent with uniformity of strength, is here employed, and is arranged in the most compact form. A longitudinal section is shown in Fig. 3 of a 1¼-inch elbow, that is, the elbow suitable for a nominal 1¼-inch tube. The dimensions for this section are obtained from the

*A paper read before the Institution of Civil Engineers, November 28, 1882.

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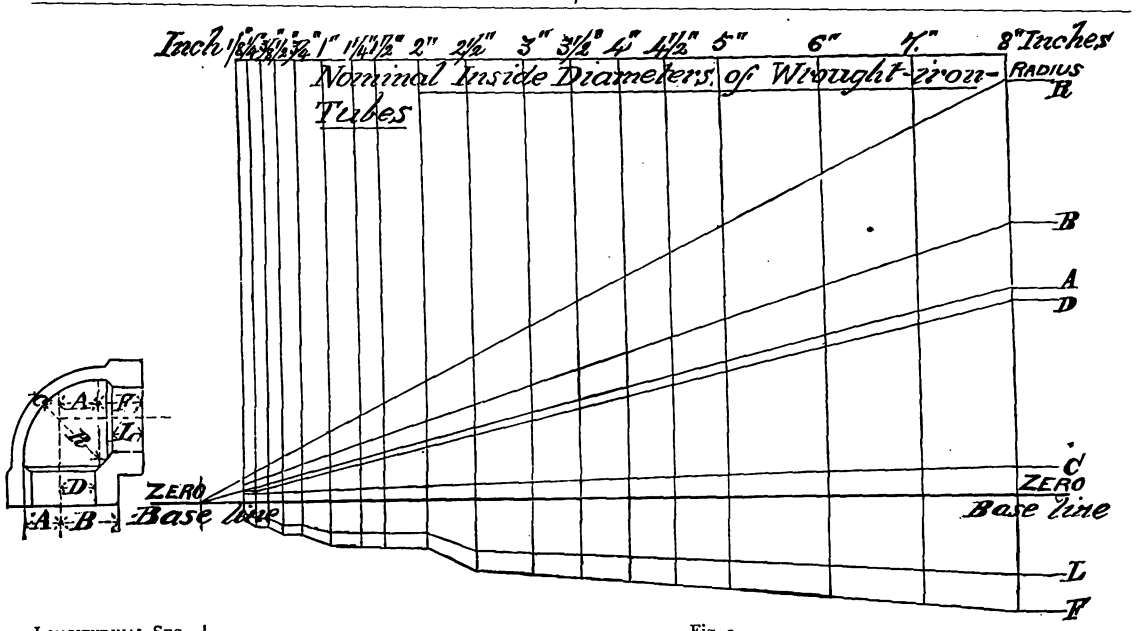
scale by measuring, along the vertical line headed 1¼-inch, the height of ordinate intercepted between the horizontal base or zero line and the slant line marked by the letter corresponding with that on the section. In the two orifices, which have to be tapped subsequently for screwing upon the tube-ends, the diameter (twice the dimension marked D in the section, Fig. 3) is cored just so much smaller than smallest diameter of the root of the thread on the tube-end as will allow for removing the scale of hard iron from the casting by means of a drill; after which a taper tap, corresponding with the external thread on the tube-end, produces the internal thread in the socket, cutting with the proper taper a perfect thread inside the orifice throughout the whole of its length, marked L in the section. There are, therefore, excepting in special cases, no imperfect threads in the cast-iron fittings or sockets.

It may be well to explain, in regard to the construction of the scale shown in Fig. 2, that the ordinates, though here headed for convenience with the nominal inside diameters of the tubes, are spaced from the zero point at horizontal distances (half full size) equal to the actual outside diameters, as given in the foregoing Table II.* Of the slant lines, only two pass through the origin or zero point:—namely, the line for the internal radius R of the back of the elbow, and the line giving the dimension A, which is exactly half the radius R. Of the remaining lines, those giving the three dimensions B, D, C, intersect the base line a little to the left of the origin or zero poin'; which means that each of the three dimensions given by these lines contains some small increment in excess of the dimension that would be strictly proportional. For instance, with regard to the thickness C at the back of the elbow, it is evident that, if the metal in any casting, whether small or large, thin or thick, were truly homogeneous throughout both its skin and its interior portion, this thickness should then be strictly proportional to the diameter or radius of the bore; but for small castings a certain allowance of extra thickness is need ed, in order to insure soundness, as well as to compensate for the increased brittleness of thin cast-iron. There will, however, be some size of fitting, for which the normal strength of metal may safely be assumed, and for which, therefore, no extra thickness will be needed. On this assumption the thickness for the largest size is set out at the end of the scale furthest from the origin; while nearest to the origin is set out the thickness proper for the smallest size in which the increment is at its maximum; and the slanting straight line drawn between these two extremes gives for intermediate sizes an increment which varies inversely as the diameter or radius. Needlessly complicated formulæ, involving higher or lower powers of the diameter, are thus replaced by the simple straight line. In the two bottom lines L and F, pertaining to the screwed portions of the fitting, which are a function of the pitch, the irregularities of slope are due to the fact already commented upon, that the pitch of the screw-thread for different diameters of tube proceeds by a medley of arbitrary jumps, instead of by a steady progression concordant with that of the tube diameter.

[To be Continued.]

* We have omitted this table.



Longitudinal Section of Cast-Iron Elbow for ¼-inch Tubes, (before tapping) quarter full size. Fig. 3.

Fig. 2.

Quarter Size Scale for Dimensions of Cast Iron Fittings.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
April 21.....	25.78	20.03	22.64	29.76	29 82	20.24

E. G. LOVE, Ph.D., *Gas Examiner.*

CONVICTED OF SELLING KEROSENE OIL BELOW THE STANDARD.

As some of our readers are aware, the State Board of Health some time ago secured the indictment of one Newman J. Nobles, of Batavia, for selling kerosene oil in violation of Chapter 292 of the Laws of 1882.

The act referred to prohibits the sale of illuminating oil which shall emit an inflammable vapor below 100° F., when tested by the instrument approved by the State Board of Health.

On the night of Oct. 4th last the dwelling of Mrs. Gay, in Batavia, was destroyed by fire, and her daughter was burned to death. Mr. A. L. Colby, an inspector under the Board, was sent to Batavia to inquire into the cause of the accident, as it was reported to have been caused by the breaking of a kerosene lamp.

It was found that on the night mentioned Mrs. Gay was moving about the house, and accidentally dropped the lamp, which was broken, and the oil igniting produced the results described. It was also learned that the oil was bought from H. B. Delano, a grocer of the village, who in turn purchased it of N. J. Nobles, a jobber, who sold considerable oil in the western part of the State.

Samples of the oil were obtained by the inspector, and sent to the analyst for examination. It was found that the oil flashed at 77° F., or 23° below the standard. Mr. Nobles was arrested in December last, and had an examination before a Justice of the Peace, who discharged him on a technical point.

In March, the case was brought before the Grand Jury, and Mr. Nobles was indicted. The trial was commenced at Batavia on the 17th inst. Mr. W. P. Prentice conducted the case for the people, while the defendant was represented by Mr. George Bowen.

Mr. Colby testified to the buying of the sample of oil, and to the fact that it was drawn from the same barrel as the oil sold to Mrs. Gay.

Prof. S. A. Lattimore, of Rochester, testified that he received the oil and tested it by the instrument approved by the Board of Health, and that it flashed as low as 77° F. In one test in which the torch was not applied until the thermometer reached 85° there was a sharp explosion, which lifted the cover of the instrument.

In opening the defendant's case, Nr. Nobles was called to the stand and testified that he bought the oil of the Phœnix Refining Co., of Buffalo. He also acknowledged selling oil to Mr. Delano, but would not admit that he knew for what purpose it was bought.

Officers of the Phœnix Co. testified to the selling of the oil, and stated that it was tested before shipment, but not by the instrument adopted by the Board of Health.

Dr. E. G. Love, of New York, testified in rebuttal that the tester used by the defendant's witnesses was not the authorized instrument. He described the differences between the two testers, and stated that an oil would not flash at as low a temperature by the instrument used by the Phœnix Co. as by that adopted by the Board of Health. He explained the difference between the flashing point and the burning point, and stated that there was no fixed relations between them.

The case was given to the jury, who returned in 15 minutes with a verdict of "guilty." Sentence was deferred; and it is reported that the case will be appealed.

This trial is one of considerable interest, inasmuch as it is the first one brought under the new law.

The officers of the Phœnix Refining Co. gave the method of oil inspection which seems to prevail at Buffalo. It was stated that the inspector of the Buffalo Fire Department examined oil in lots of 500 or 1,000 barrels, and then left his stamp with the company who marked the barrels. This plan is certainly simple, if nothing else. The oil sold by Mr. Delano to Mrs. Gay was branded in this way.

STORAGE OF ELECTRICITY.

The members of the New York Electrical Society assembled recently in one of the lecture rooms of the Stevens Institute of Technology, Hoboken, N. J., to hear a paper on the "Storage of Electricity," by President Henry Morton of the above named institution.

The room was brilliantly illuminated by incandescent lamps supplied by the Edison Electric Lamp Co., which were supported in chandeliers and brackets of tasteful design. There was also on the lecture table a two-horse power electric motor manufactured by the Western Electric Co., provided with measuring instruments to show the amount of electric current used, and a dynamometer to measure the power generated. The electric lamps and motor were supplied with electricity from a number of wooden boxes arranged in front of the lecture table and at the back of the room, which contained the electric storage batteries known as the Selou-Volckmar Accumulators. These were made in England at the works of the Electrical Power Storage Co. of London, and have been for the last three months at the Stevens Institute, where they have been rigorously tested by President Morton as to their electrical properties and capacities.

President Morton opened his paper by describing the fundamental principles involved in any of the present methods of electrical storage, and then proceeded to give a very brief historical sketch of the discovery of these principles and their application to this subject.

He first alluded to and described the gas battery of Prof. Grove; then the secondary battery of Planté; then the improvements of Faure, Swan, Selou and Volckmar, culminating and combined in the battery used on this occasion, and now controlled by the Electric Accumulator Co. recently organized in this city. The peculiar structure of this battery was then fully shown, and it was seen to consist of plates, each made up of a fine lattice work of metallic lead filled in with a porous mass, which was in each alternate plate either metallic lead or the black per-oxide of lead. The manner of operation of these cells in charging and discharging was then explained at some length and the important part played by the absorbed or accluded gases was pointed out.

President Morton then stated the results of some of his tests made upon these batteries. These showed that each cell would yield a continuous current of about 32 amperes for nine hours, with an electro-motive force of about 2.2 volts. This quantity of current would supply 44 of Mr. Edison's incandescent "A" lamps of 16 candle power, and its intensity would make it necessary to employ only 50 of the cells to obtain sufficient electro-motive force to overcome the resistance of such lamps. The entire weight of each cell ready for work is 80 pounds, and thus, as a simple rule, it might be stated that for each light of 16 candles for one hour ten pounds of battery should be provided, if the battery were used solely as a reservoir to contain the entire current required.

It was, however, pointed out in this connection that the battery in many cases would only be required to act as

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regulator, not storing the entire amount of electricity used, but only taking up a temporary excess and providing for a similar deficiency. Under such conditions it would not need to have capacity to supply more than one or two hours of current, and nearly all the current during normal working would go directly from the dynamo machine, the fluctuations or momentary stoppages only being taken care of by the battery. To illustrate this, the lights in the room were connected directly with a dynamo and its current was caused to fluctuate so that the lights were extremely irregular; as soon, however, as the battery was also connected so that any excess of current could flow into it, and any deficiency be supplied by it, the lights became perfectly steady.

In the next place the use of the storage batteries as a means of driving street cars was touched upon. President Morton said that measurements which he had repeated (upon these batteries whose weight was 80 lbs. each) a number of times showed that each of them contained energy equal to about 1,800,000 foot pounds, or such as could develop one horse power for one hour nearly. In other words, the energy stored in one of these boxes, if fully converted into mechanical work, could take a "bob-tail car" full of passengers across town or from one end of the city to the other—in fact could take the place of a horse for an hour. Another mode of expressing this amount of energy was to say that such a battery, if its energy could be applied to lifting it up, would be able to raise itself 20,000 feet or four miles up from the ground.

To illustrate the operation of the batteries in driving an electric engine or motor, some experiments were made with one of these machines made by Mr. Edward Weston, of Newark, and similar to one used by him to run the machinery in a department of his shop. The machine being connected with the storage battery started at once into rapid motion, and a dynamometer as well as instruments to measure the electric current being applied, it was shown that the efficiency of the current in producing motion was very great.

Professor Morton also stated that he had given the battery a practical test by placing some cells in his house and using them to operate electric lamps in his parlor and dining room. They had been in constant operation there for over three months, during which the battery had to be recharged only four times. This recharging was affected once by removing the battery to the Stevens Institute and since by connecting it with a telegraph line running between the institute and his house.

According to his measurements President Morton said that this battery had fully double the capacity of the Faure battery and many times the capacity of the Planté battery or of the Cabath cell or other modification of the Planté apparatus, and while much remained to be done in the improvement of its construction and in the development of appliances necessary for its ready use, yet it had certainly reached a remarkable degree of efficiency already.

CONSIDERATION OF THE UNDERGROUND WIRE PROBLEM.

Representatives of nearly all the telegraph, telephone and electric light companies of this city were present at a meeting called by Col. R. R. Hazard, president of the Gramme Electrical Company, at this company's office on Friday last, to consider the expediency and best methods of procedure in regard to putting all wires in this city underground. Resolutions were adopted favoring an extenstive examination to determine whether any inclusive system can be found, and the appointment of a committee for this purpose, consisting of one delegate from each electrical company, the governor of the State and the mayor of the city. We will comment on this action in our next issue.

ELECTRIC LIGHT NOTES.

The Hartford Electric Light Company will have 100 lights in operation in that city in a few days. The company has now 28 paying lights, 21 of which are at the depot.

The Troy Electric Light Company has been incorporated with James A. Kaveny, E. W. Hydorn and J. Bartlett Hydorn as incorporators. E. W. Hydorn says he will make a contract for five years to light the city by electricity for $25,000 a year.

The building containing the generating apparatus of the Brush Company, at Cincinnati, was burned on the 21st inst.

A scheme has been proposed for lighting the entire Swiss Canton of Vaud by electricity. The motive forces would be derived from turbines of 5,000 horse power, the water supply being constant and abundant.

The Dakota apartment houses at Eighth avenue and Seventy-second street, this city, are to be lighted with 5,000 Edison lamps, of 16 candle power each. The apartment house 121 Madison avenue will have about 1,200 lamps.

Meter-ites.

The Baltimore gas companies have agreed to charge $1 per 1,000 cubic feet, and one of the St. Louis companies has reduced its price from $2.50 to $1.50.

Health Commissioner Raymond, of Brooklyn, has sent to the Common Council a communication requesting the appropriation of $500, to be expended in making the analysis of coal and water gases, and investigating as to the number of deaths caused by each in New York and Brooklyn, which investigation was requested by the Lamp and Gas Committee. The investigation will cover the period since 1849, when there was the first record of a death from gas.

The Gas Commission have awarded contracts for the public lighting of the city for the year commencing May 1, as follows: New York, Manhattan, Mutual and Metropolitan Gas Companies, $17.50 per lamp; Harlem Gas Co., $19 50; Central Gas Co., $29 per lamp; Northern Co., $32; and Yonkers Co., $30 per lamp. The Brush Electric Illuminating Co., and the U. S. Illuminating Co., receive contracts as at present at 70 cents per lamp per night, for arc lights. It was stated that each electric light displaced six and one-third gas lamps. The cost of lighting by gas, therefore, is $110.83, as compared with $255.50 for electric lamps, or a difference of $144.67 in favor of gas.

The report of Mr. S. McCormick, Supt. of Lamps and Gas, for the quarter ending Dec. 31, 1882, shows that on that date there were 23,747 gas lamps and 128 electric lamps in this city. Of the electric lamps 55 were furnished by the Brush Co. and 73 by the United States Illuminating Co. The 73 lamps of the latter company replaced 507 gas lamps. The cost of lighting the public lamps (not including electric lamps) was $464,684.80 for the year. The electric lamps, cost $22,500.74; but of the total number of lamps, 73 were not lighted throughout the entire year.

The report contains the following facts relative to the working of the two electric light companies: The U. S. Illuminating Co. has 166½ miles of wire conductors on poles, 553 arc lamps on 31 circuits, and five stations. The Brush Co. has 150 miles of wire conductors on poles, 1,113 arc lamps on 17 circuits, and two stations.

NEW JERSEY ANALYSTS.

The New Jersey State Board of Health held a meeting at Trenton, on Friday, April 13, at which, besides the ordinary routine of business, the appointment of analysts under the provisions of the amended Food Adulteration Law were made. Prof. H. B. Cornwall, of Princeton, Prof. F. A. Van Dyke, of Rutgers College, New Brunswick, and Mr. Shippen Wallace, of Burlington, were appointed analysts, and Dr. Wm. K. Newton, State Inspector of Milk, as inspector. These, together with Dr. Cyrus Brackett and Dr. Albert R. Leeds, constitute the Committee of Analysts; the two latter gentlemen are *ex officio* members, representing the State Board of Health, Dr. Leeds being Chairman of the Committee. The Committee were instructed to prepare and submit to the Board, for their approval, a plan of operations.

RULINGS AS TO MIXTURES.

NEW YORK, *April* 22, 1883.

To the Editor of THE SANITARY ENGINEER:

Can you inform me whether the resolutions relating to coffee and mustard mixtures, passed by the State Board of Health at their last meeting, and printed in your issue of March 1, have as yet been signed by the Governor, and consequently become law? Also, whether the resolutions passed at the previous meeting of the Board, fixing the standard of cider vinegar, has been approved by the Governor? I notice the resolution refers especially to "cider vinegar." Are vinegars from other sources than cider included in the resolution? If so, would not a legal difficulty arise in case of prosecution unless the analyst could prove that it was a genuine cider vinegar?

Yours, etc., FRIEND.

[The coffee and mustard mixture standards have received the Governor's approval, as will be seen by reference to our issue of April 5. The suggestion about vinegar should be called to the attention of the Attorney of the Board, and his opinion obtained.]

SKIM MILK LAW IN NEW JERSEY.

The New Jersey State Inspector of Milk has sent out the following notice:

OFFICE OF THE STATE INSPECTOR OF MILK,
PATERSON, N. J., *April* 16, 1883.

Your attention is called to the provisions of Chapter 185, Laws of 1883. This law, passed by the Legislature of this State and signed by the Governor, March 23, 1883, provides that no milk from which the cream or any part thereof has been removed shall be brought into or offered for sale in any city of the first class, under a penalty of $50 for the first offence and $100 for the second offence.

This law repeals the permission formerly given to sell skimmed milk in marked cans. WM. K. NEWTON,
State Inspector of Milk.

Correspondence.

PLUMBERS' PROFITS.

MONTREAL, *April* 18, 1883.

To the Editor of THE SANITARY ENGINEER:

Mr. Moody's letter opens up an interesting question, viz., the progress of a better class of ideas among the general public in regard to the plumbing trade. I may say that progress has been made here, but so far it partakes more of the nature of inquiry than of the actual fitting up of superior work, although it cannot be denied that work of late years is in the direction of a class of jobs on more correct principles. Our people are beginning to realize the fact that there are two kinds of plumbing work, but the contract system is universal, there being only enough exceptions to prove the rule. The want of a plumbers' by-laws is certainly felt, but some progress has been made in that direction. Our architects are also waking up, but need educating in the direction of a knowledge of the cost of work as called for, it being not infrequent that work is taken at a price that would not pay for the cost of materials as specified. Hope you will endeavor to enlarge the circle of your readers in our city. The trade here is not the bonanza the public think.

G. W. HUGHES.

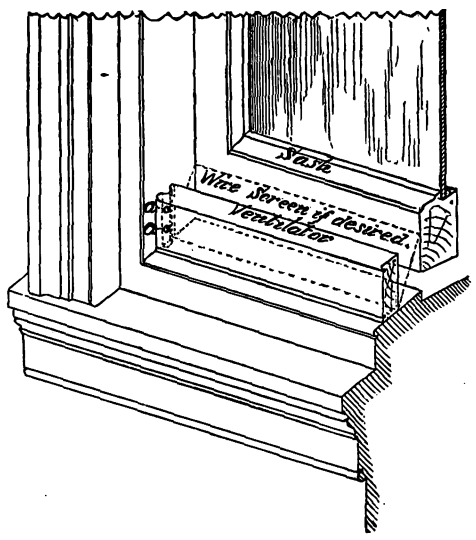
WINDOW VENTILATORS.

PHILADELPHIA, PA., *April* 11, 1883.

To the Editor of THE SANITARY ENGINEER:

I notice in your issue of the 5th inst., page 415, an inquiry regarding window ventilators. Having had occasion to use something of the kind, I have devised and used with very good results a modification of the old plan of setting a strip under the sash, for the sake of the air entering at meeting rails, of which please find a sketch enclosed.

It consists simply of a piece of board, as long as the width of window and three or four inches high, set about an inch back of the sash and secured in place by vertical grooves in the ends, sliding over two round-headed screws in the stop head at each side of window.



By raising the sash a trifle, air is admitted in a thin sheet and deflected upward, and there is the same action at the meeting rails, which is all I have ever seen attempted by anything of the sort. A wire-gauze screen can be bracketed to the outside of the strip if desired.

The cost is nominal; there is no interference with using and fastening the sash in the usual way; the strip can be removed in an instant, and whether it is in or out, the window is not disfigured. Yours, C.

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LEAD BURNING.

NEW YORK, *April* 18, 1883.

To the Editor of THE SANITARY ENGINEER:

Having seen Mr. Walker's letter on lead burning in your issue of April 5, I would like to suggest that some of his patches can be made more simply than he describes.

In regard to Figure 5 of Mr. Walker's letter, each and all

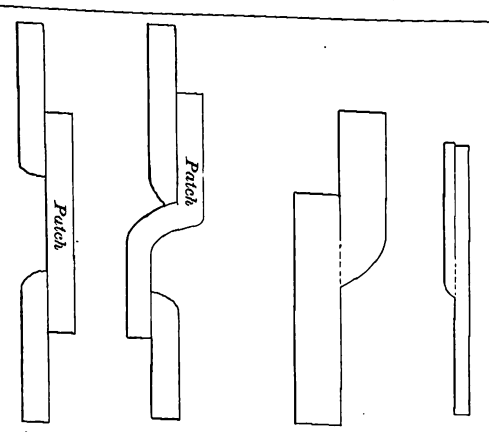

Fig. 1. Fig. 2. Fig. 3. Fig. 4.

of the patches can be placed on the outside of the lead without the jog which he shows, and can be burned underneath as well as by inserting the bottom part of the patch in the back sheet of lead, though I admit it takes more skill, because the lead has a tendency to drop from the lower part of the patch; but the skill in managing the blow pipe to prevent this is the work of a good lead burner. For instance, the amount of work on the patch *F* in Fig. 5 of Mr.

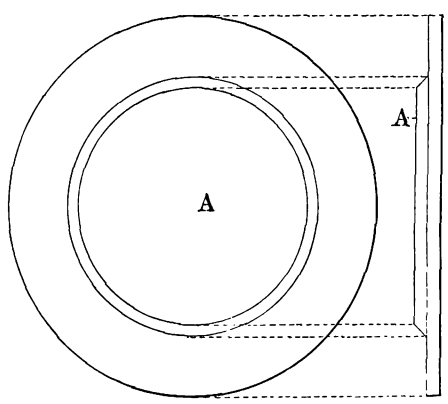

Figure 5.

Walker's letter is nearly double what it would be if done by this method. The little drawing I inclose shows the difference, and why the latter is more simple, Fig. 1 being Mr. Walker's way, and Fig. 2 the better plan.

In making a joint on a horizontal pipe, instead of opening the pipe on top, the ends of the two pipes are to be inserted and burned on the outside all around, thus showing that a great deal less work is required, besides avoiding cutting the pipe.

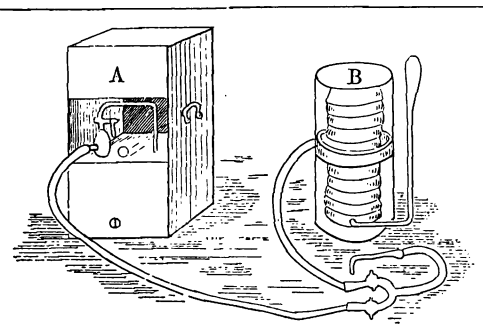

Figure 6.

In regard to his getting oxygen from the hydrogen generator, I raise the question how this can be done. I have always used a bellows and cannot do without it. I would like to have Mr. Walker explain just how he does it.

Figures 3 and 4 show specimens of work with thick and with thin sheets. Fig. 5 a round patch shown in elevation and section, *A* being the patch. Fig. 6 is the apparatus, *A* is the hydrogen generator and *B* the bellows.

Yours truly, CHARLES E. FIELD.

115 John street.

NEW YORK, *April* 13, 1883.

To the Editor of THE SANITARY ENGINEER:

Mr. Hudner can burn his boxes as handily with the hatchet bolt as with the machine. It is as simple as soldering on small work like that, as twenty years ago, ten out of twelve plumbers would tell you. M. R.

GAS FITTING IN TOPEKA.

OTTUMWA, IOWA, *April* 16, 1883.

To the Editor of THE SANITARY ENGINEER:

Seeing in your last issue an application for a drawing with location of gas fixtures and meters for an office building in Topeka, Kansas, I thought it looked as if folks there were not posted much in such matters.

In justice to the trade, I would say there are several practical men there who have done the fitting in some of the largest buildings in the East, and who are capable of locating fixtures or meters in any building that will ever be erected in a country town like Topeka, as they have proved themselves to be in fitting up the largest office building in the town, recently built there.

Respectfully yours,

ONE OF THE TRADE.

AN ACT

Relating to the further supply of pure and wholesome water for the City of New York.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Commissioners of the Sinking Fund of the City of New York are hereby authorized and empowered to make and cause to be made such investigation as they may deem necessary and proper, to enable them to ascertain and determine the practicability of securing for said city a permanent supply of pure and wholesome water to meet the growing demands of the city, from the district embraced in the counties of Rockland and Orange; and for this purpose to take all action suitable and necessary, and to secure the services of such competent persons as they may select to aid and assist them therein.

§ 2. The Department of Public Works of the said city, and the Commissioner of Public Works, the head of said department, is hereby directed to furnish all information required, and such assistance as may be deemed necessary by the said Commissioners of the Sinking Fund in the performance by them of the duties specified in and required by the preceding section of this Act, and the Board of Estimate and Apportionment of said city shall appropriate such amount as in its discretion it may deem necessary to enable the said Commissioners of the Sinking Fund to perform the duties aforesaid, and such amount, certified by the Comptroller of the city, shall be added to and included in the final estimate of the city for the year eighteen hundred and eighty-three.

§ 3. When satisfied, after such investigation as they may deem necessary, that it would be for the public interest so to do, the said Commissioners of the Sinking Fund may, at their discretion, make and enter into a contract of lease for such period as they may determine, containing such conditions, provisions and stipulations as the said Commissioners may consider to be necessary and proper in the interests of the city, with any corporation formed, or which may be formed, under and pursuant to the authority conferred by chapter eighty-five of the laws of eighteen hundred and eighty, and chapter four hundred and seventy two of the laws of eighteen hundred and eighty-one, for the delivery by such corporation, from the district embraced in said counties of Rockland and Orange, to the City of New York, within two years from the date of such lease, of not less than fifty millions of gallons of pure and wholesome water daily, during the continuance of such lease, with a pressure due to a head of three hundred feet above tide everywhere in the city, the water so to be delivered to be equal in purity to the water supplied from the Croton system, and the rate of compensation therefor not to exceed for each million of gallons supplied the actual cost during the year eighteen hundred and eighty-two of each million of gallons supplied to the city from the Croton system, during such year, as shown by the actual expenditure by the city during the year, and which lease may provide for the purchase by the city of all the rights and interests of the said corporation in and to the water rights and grants obtained and secured by them, and the works constructed by them for the delivery in said city of fifty millions of gallons of water daily, when the said Commissioners of the Sinking Fund shall deem such purchase to be for the interest of the city, provided such purchase is determined upon by said Commissioners within three years from the date of the completion of such works, and that the cost of said purchase shall not exceed the sum of six millions of dollars; and whenever required so to do by the said Commissioners of the Sinking Fund, it shall be the duty of the said Commissioner of Public Works, under the authority now conferred by law, to proceed with and perfect such works as may be necessary within the limits of said city for receiving and fully utilizing to the public use the water furnished and supplied to said city, pursuant to such contract of lease, but nothing in this lease contained shall be held as in any way interfering with, hindering or delaying the construction and use of such works now authorized by law, or which may be hereafter authorized, relating to the procuring or obtaining an increased supply of water from or in connection with the Croton aqueduct system of said city.

§ 4. Whenever the said Commissioners of the Sinking Fund shall deem it to be for the best interest of the city, they may authorize the construction of a special fire service in connection with the supply of water hereby provided for, for the use of the dry goods district of the city, so-called, and to make and enter into such contracts and arrangements with the said company as may be necessary for this purpose, and to fix and determine the rental of each occupant and owner in said district for the use and service thereof, and upon the faith and credit of such rental, to authorize the Comptroller of said city to borrow, on the bonds of the city, such sum as may be found necessary to meet the expense of constructing such service, not exceeding one million dollars. The rents received for the use of such special service to be applied to the payment of the interest upon such bonds, the balance to be paid into the Sinking Fund of said city, to be applied to the payment of the principal of said bonds at maturity.

§ 5. This act shall take effect immediately.

PERSONAL.

Dr. G. B. Thornton, of Memphis, has been re-elected a member of the State Board of Health of Tennessee. Dr. T. A. Atchison, of Nashville, was elected President and Dr. J. M. Safford, of Nashville, Vice-President of the Board.

Mr. Carl Hering, assistant to Prof. Barker in electrical engineering, University of Pennsylvania, has been commissioned by the Franklin Institute to visit the Electrical Exposition held in Vienna this summer.

Governor Stoneman has made the following appointments of members of the State Board of Health of California:—Drs. W. A. Douglass, J. C. Shorb, O. O. Burgess and Arthur W. Perry.

Dr. Cameron, analyst for County Down, Ireland, in his recent half-yearly report, states that, as compared with former returns, a great improvement has taken place in the quality of the articles of food and drink sold in the county. Of 114 specimens of food sent for analysis, only five were adulterated, viz.: two of whiskey, one of coffee, and three of milk.

MILWAUKEE SCHOOL PLANS.

At its last meeting, the Milwaukee (Wis.) City Council appropriated $500 for model school house plans, and the Board of Public Works will soon advertise for the same. All school buildings hereafter will be constructed according to one of those plans. Special specification is made for substantiality, good heating, lighting and ventilating facilities. The plans are for school buildings of four, eight and fourteen class rooms respectively.—*Milwaukee Sentinel, April* 20, 1883.

PENNSYLVANIA.—A joint resolution has passed the Pennsylvania House authorizing the governor to appoint a commission to suggest remedies against the pollution of rivers.

Small-pox has almost depopulated Morristown, Tenn. Five hundred people attended the funeral of two men supposed to have died of measles, and many were stricken with the scourge.

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Construction Notes.

The Rœsch Bill, to prevent the Board of Health of New York from prohibiting the use of vitrified drain pipe inside buildings, passed the assembly of this State, on the 23d inst. Before becoming a law it has to pass the senate and secure the Governor's approval.

ALBANY.—The bill appropriating $1,000,000 for the new capitol, having previously passed the Senate, was last week put through the Assembly.

WALTHAM, MASS.—Fuller and Delano are architects for two brick school houses, which are to be built this spring, and for which proposals are asked by E. W. Lane, Secretary of the Committee.

NIAGARA RIVER.—Engineers have begun locating the stone piers of the new bridge. It will be 245 feet above water, and 500 feet span; length over all, 900 feet. The contract calls for its completion Nov. 1, 1883. The cost, with land for approaches and yards, will be upwards of $1,000,000.

SOUTH NORWALK, CT.—The bridge committee have closed contracts with S. A. Hammond, of Providence, for piling and mason work, at $12,000, and with the East Berlin Iron Bridge Company, for iron work, at $9,650.

WOONSOCKET, R. I.—A resolution validating the action of the Town Council, in giving to George H. Norman exclusive right, for 50 years, to lay water pipes in the town, passed the State Senate April 11. During the debate it was stated that the cost of laying the pipes, etc, will cost between $300,000 and $400,000.

PHILADELPHIA.—The final report of the Board of Experts appointed to consider the water supply of the city, was sent by the Mayor to the City Councils last week. The members of the Board are: E. S. Chesbrough, J. U. Merrick, Frederick Graff and William Ludlow. They recommend the application of the $525,000, which is available as follows:

For Schuylkill Works, $263,000; Germantown mains, $70,000; Roxborough, $62,000; Frankfort, $50,000; surveys for determining sources of future supply, $20,000; leaving a balance of $59,500, of which $39,500 should be transferred to the item for "buildings, grounds and reservoirs," and $20,000 allotted to the general contingencies of the department. They advise for the Schuylkill and Roxborough Works horizontal compound duplex engines, similar to the Worthington engines, and for the Frankfort Works a compound rotating engine.

On the question of purifying the Schuylkill and Delaware rivers at the points where the water supply is taken, they say if the impurity can be reduced to a safe point, the present sources of contamination removed and guarded against for the future, and sufficient quantities be had, it it is unnecessary to look to more distant sources. If this cannot be accomplished, it will be needful to draw from one or the other of these rivers at points higher up. Careful detailed analyses must be made of the water obtained from different points, in order to trace the causes of impurity, as well as careful topographical and geological surveys. Gaugings of the streams and of the rainfalls over the areas draining into the Perkiomen, Skippack, Wissahickon, etc., are required, as well as the affluents of the Delaware, if such should be found necessary. The surveys should be especially directed to ascertaining where, to what extent, and at what cost impounding reservoirs can be constructed, and the several available routes for conduits carefully investigated, with a view to determine their cost. They advise that measures should be taken to check waste, and say on this point:

"It is impossible even to approximate the amount of water used, on the basis of a given size of ferrule, because the quantities passing vary in different localities according to the pressure, and because the use in some localities is more constant than in others. The only equitable mode of assessing in such cases is by the quantity actually consumed. This at the same time should check wastefulness. In most of the large cities the use of meters for large consumers has been found of great value. On the other hand, it is not desirable to affix meters to houses. The first cost of these would have to be borne by the department, but they might be made to earn a large interest on the investment, and would undoubtedly result in so considerable an increase of revenue, in certain cases, as to warrant a reduction in others, and the furnishing of water to houses at a cheaper rate than at present. At the same time it would be found that the consumption per capita would decrease, and with it, proportionally, the expense of the department."

The Gas Trustees, at their meeting last week, rejected the contract awarded to Michael O'Rourke for excavating for the big gas main, at $14,971, on the ground that O'Rourke was a member of councils, and forbidden by law to have an interest in any contract with a city department. Proposals will be re-advertised for.

The sub-committee on extension of works of the Water Committee of Councils, reported on the 17th inst., recommending an appropriation of $251,500 for new works. The report was adopted, and the Chief Engineer instructed to proceed with the work.

NEW BEDFORD, MASS., has appropriated $100,000 for additional water mains and meters.

COLUMBUS, O.—Proposals for completing the northwest main trunk sewer will be received by John Graham, City Engineer, until April 30.

WILMINGTON, DEL.—The Levy Court, April 12, voted to construct a new bridge on the line of Market street, to be of iron, with draw 236 feet long. Estimated cost, $55,000 to $57,000.

BROOKLYN.—The Aldermanic Committee on water and drainage have decided to appropriate $7,102 for replacing cement water pipe in Bedford avenue with iron pipe, and favor an appropriation of $9,586, for substituting iron pipe in Wilson and Taylor streets and Lee and Wythe avenues.

NEW YORK.—The Department of Public Parks ask for proposals, until May 2, for constructing 540 feet of 12 inch pipe sewer and appurtenances in 144th street; also 175 feet of brick sewer, 3 feet by 2 feet 2 inches; 862 feet of brick sewer, 2 feet 6 inches by 20 inches; 284 feet of 12-foot pipe sewer; 306 feet of 15-inch pipe sewer; 1,685 feet of 12-foot pipe sewer and appurtenances, in North Third avenue and 167th, 163d and 164th streets; also for 1,270 feet of 12-foot pipe sewer in 138th street; also for paving, grading, etc., between Southern Boulevard and North Third avenue.

The following are the lowest bids received at the Department of Docks on the 19th inst.: For labor and material for building a wooden platform north of the storehouse pier on Blackwell's Island, James D. Leary, $1,589; for crib bulkhead, with appurtenances and filling, in rear of same, at foot of 99th street, East River, James D. Leary, $5,490; for bulkhead platform at foot of 104th street, Harlem River, James D. Leary, $1,094; for new wooden pier, with temporary approach at foot of 55th street, North River, John Gillies, $30,296.

AMESBURY AND SALISBURY, MASS.—The committee on water supply, of the State Senate, reported a new draft of the bill to incorporate W. E. Biddle, J. R. Huntington, M. D. F. Sleere, R. F. Briggs and E. R. Sibley as the Powwow Hill Water Company, to supply water to Amesbury and Salisbury, with a capital of $75,000; amended so as to provide that the supply shall be taken from the east branch of the Powwow River in Salisbury, known as Back River, at a point known as Clark's Pond.

MARBLEHEAD, MASS.—In the Senate, April 16, the committee on water supply and drainage reported a bill to incorporate the Marblehead Water Company, with a capital not to exceed $250 000.

HOLLAND, MICH.—The Common Council has been authorized to bond the city for $22,000 to establish a system of water works for city use, especially for defense in case of fire.

CONCORD, N. H.—A contract has been awarded to Messrs. Goodhue & Birnie of Springfield, Mass., to lay cement lined water-pipe, as follows: 11,460 feet, 18 inches diameter; 3,290 feet, 12 inches diameter; 650 feet, 4 inches diameter, for the sum of $44,900.—*Engineering News.*

LA CROSSE, WIS.—Benezette Williams, C.E., of Chicago, formerly in charge of the sewers of that city, and recently the engineer for the sewerage of Pullman, Ill., has prepared a plan of sewerage for the city of La Crosse, which, probably, will soon be carried out.

JERSEY CITY.—The Hackensack Water Company, from whose mains the city of Hoboken is now supplied, has proposed to connect its pipes with the Jersey City system, so as to prevent a water famine being caused in either city, either by the scarcity of the supply or by the breaking down of machinery. The matter was considered at a conference held yesterday between the directors of the Water Company and a joint committee of the Boards of Finance and Public Works, which resulted in the approval of the proposition and the adoption of a scale of prices to be paid by the city receiving the supply.—*N. Y. World.*

MAQUOKETA, IOWA.—It is intended to build water works, for which proposals will be received by the City Clerk until May 1.

CHICAGO.—Harry Fox & Co. were given a contract, April 14, to build the substructure of Ashland avenue bridge, for $6,502. The other bidders were Chicago Dredging and Dock Co., $7,000; Sooy Smith & Son, $7,448.

Bids to supply the city 50 tons of lead were received as follows: E. W. Blatchford & Co., $4.32½ per 100 lbs.; Jas. N. Raymond, $4.39½. The committee will re-advertise for 150 tons.

The Wolf Manufacturing Company receives the contract, at $4,725, to supply "corporation taps." The other bidders were: O. Owens, $4,800; Crane Brothers Manufacturing Company, $5,080; Wild & Hill, $5,610.

NEW JERSEY.—A resolution was adopted at the late session of the Legislature on the question of riparian rights that a committee of five members of this House be appointed by the Speaker to inquire into the subject of riparian rights, as they affect the State and its citizens, the said committee to have leave to sit during recess, with power to appoint a clerk, send for persons and papers, and to examine witnesses under oath; and that the said committee shall report to the Legislature, by bill or otherwise, at the next session.

The following members of Assembly were appointed as the committee: Messrs. Freeman, of Middlesex; Neigbour, of Morris; Robbins, of Hunterdon; Cator, of Hudson, and Cranmer, of Ocean.

A bill was introduced in the New York Senate, April 16, authorizing the Superintendent of Public Works to construct a reservoir on the Black River, at Forestport, Oneida County, and appropriating $20,000 for the purpose.

The committee on Water Supply and Drainage of the Massachusetts House have reported a bill to authorize cities, towns, fire districts and aqueduct companies to hold water for sale, and to sell the same to other cities, towns, fire districts and individuals.

GOVERNMENT CONTRACTS.

The following bids were opened, April 19, at the office of Gen. M. C. Meigs, Supervising Architect of the New Pension Building, Washington, D. C., for 12,500 pounds of sheet lead cut to dimensions. The bidders were as follows:

Le Roy Sheet Lead Manufacturing Company, New York, 6 cents per pound in New York; James Robertson & Co., Baltimore, 7 cents. The remaining bidders were all from Washington, as follows: J. B. Randall, 6⅞ cents; James Ragan, 9½ Robt. Leitch & Son, $6\frac{78}{100}$; W. Rothwell, 7¾; Thos. Sommerville & Son, $6\frac{7}{10}$; J. F. O'Brien, 8½; J. H. McGill, $7\frac{69}{100}$. The contract was awarded to J. H. McGill. The contract for 69,200 square feet of terra cotta ro fing has been awarded to the Potomac Terra Cotta Company, of this city, at 10 cents per square foot.

At the meeting of the Engineers' Club, of Philadelphia, April 7, Mr. Arthur Winslow described the derivation of tables for stadia reductions; Mr. C. O Hering presented a table of electrical units of work and power corresponding to all mechanical units, such as horse power, foot pounds, kilogrammetres, heat units, etc., and the Secretary presented for Mr. P. F. Brendlinger a description of a bridge specification. An amendment to the by-laws was passed, concerning methods electing members, and a committee was appointed to make a revision of the by-laws.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

At the meeting, April 18, the deaths of John C. James, of Winnipeg, and Simon Sheldon, of Cleveland, were announced. The Secretary stated that arrangments were well advanced for the convention of the society at St. Paul and Minneapolis beginning June 20. The president's address will be delivered at Minneapolis, where one meeting will be held, the ordinary meetings taking place at St. Paul. Arrangements are now being made with railroads and hotels for the conveyance and accommodation of members. A paper by the late Wm. R. Morley, on proper compensation for railway curves upon grades, was read by the secretary. It will be printed in the Transactions and will be discussed at the Convention.

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CITY OF WATERBURY SEWERS.—CANVASS OF BIDS RECEIVED APRIL 12, 1883.

FOR BRICK SEWERS.

BIDDERS.		W. E. Deane, N. Y. City.		M. Fitzpatrick, Jersey City.		Wellington & Madden, Waterbury.		J. W. Gaffney, Waterbury.		Jas. Judge & Co., Jersey City.		J. D. Miner, N. Y. City.		Sylvester Bissell, Hartford.		L. W. Burt, Hartford.	
ITEMS.	Quantities.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.
Brick Sewer, 4'-3" x 2'-10"	410 l. f.	$ 7.00	$ 2,870.00	$ 6.00	$ 2,460.00	$ 6.95	$ 2,849.50	$ 8.35	$ 3,423.50	$ 8.21	$ 3,366.10	$ 9.00	$ 3,690.00	$ 9.00	$ 3,690.00	10.90	$ 4,469.00
" " 4'-0" x 2'-8"	1,140 "	6.00	6,840.00	6.00	6,840.00	6.25	7,125.00	8.40	9,576.00	8.21	9,359.40	9.00	10,260.00	8.00	9,120.00	10.00	11,400.00
" " 3'-9" x 2'-6"	370 "	6.00	2,220.00	5.50	2,035.00	6.35	2,349.50	8.62	3,189.40	8.21	3,037.70	9.00	3,330.00	8.00	2,960.00	10.50	3,885.00
" " 3'-3" x 2'-2"	550 "	6.00	3,300.00	4.85	2,667.50	5.65	3,107.50	5.51	3,030.50	6.75	3,712.50	9.00	4,950.00	7.00	3,850.00	7.25	3,987.50
" " 3'-0" x 2'-0"	75 "	6.00	450.00	6.00	450.00	6.35	476.25	6.05	453.75	6.15	461.25	7.00	525.00	6.00	450.00	6.50	487.50
" " 2'-6" x 1'-8"	1,130 "	3.00	3,390.00	2.90	3,277.00	3.75	4,237.50	4.00	4,520.00	5.15	5,819.50	4.50	5,085.00	5.50	6,215.00	3.85	4,350.50
" " 2'-3" x 1'-6"	5,530 "	2.90	16,037.00	3.90	21,567.00	3.95	21,843.50	3.36	18,580.80	4.05	22,396.50	4.50	24,885.00	5.00	27,650.00	3.65	20,184.50
" " 2'-6" x 1'-6"	960 "	2.90	2,784.00	2.90	2,784.00	3.55	3,408.00	3.12	2,995.20	4.05	3,888.00	4.50	4,320.00	3.00	2,880.00	3.45	3,312.00
" " 3'-6" x 2'-4"	1,140 "	6.00	6,840.00	6.00	6,840.00	6.95	7,923.00	7.95	9,063.00	7.65	8,721.00	6.65	7,581.00	7.00	7,980.00	8.65	9,861.00
" " 3'-3" x 3'-9"	200 "	4.00	800.00	4.50	900.00	4.65	930.00	6.25	1,250.00	4.35	870.00	6.65	1,330.00	5.00	1,000.00	6.75	1,350.00
Manholes	26	35.00	910.00	60.00	1,560.00	50.00	1,300.00	50.00	1,300.00	55.00	1,430.00	30.00	780.00	50.00	1,300.00	85.00	2,210.00
Lampholes	14	22.00	308.00	15.00	210.00	12.00	168.00	20.00	280.00	20.00	280.00	10.00	140.00	20.00	280.00	30.00	420.00
Wasteways	2	50.00	100.00	175.00	350.00	350.00	700.00	200.00	400.00	100.00	200.00	50.00	100.00	100.00	200.00	170.00	340.00
Terminal Chamber	1	100.00	100.00	200.00	200.00	250.00	250.00	200.00	200.00	100.00	100.00	25.00	25.00	75.00	75.00	600.00	600.00
Flushing Inlets	2	50.00	100.00	300.00	600.00	200.00	400.00	300.00	600.00	100.00	200.00	25.00	50.00	50.00	100.00	200.00	400.00
Catch Basins	25	200.00	5,000.00	170.00	4,250.00	100.00	2,500.00	125.00	3,125.00	110.00	2,750.00	90.00	2,250.00	140.00	3,500.00	160.00	4,000.00
Pipe Sewer, 8"	1 l. f.	1.50	1.50	1.40	1.40	1.00	1.00	1.20	1.20	.50	.50	2.00	2.00	.95	.95	1.59	1.59
" " 9"	1 "	2.00	2.00	1.50	1.50	1.35	1.36	1.30	1.30	.60	.60	2.00	2.00	1.50	1.50	1.69	1.69
" " 10"	1 "	2.00	2.00	1.65	1.65	1.50	1.50	1.50	1.50	1.25	1.25	2.00	2.00	2.00	2.00	1.79	1.79
" " 12"	1 "	2.00	2.00	1.90	1.90	1.85	1.85	1.60	1.60	1.50	1.50	2.50	2.50	2.00	2.00	1.95	1.95
" " 15"	1 "	2.25	2.25	2.20	2.20	2.25	2.25	2.25	2.25	1.95	1.95	3.00	3.00	2.00	2.00	2.30	2.30
" " 18"	1 "	2.50	2.50	2.80	2.80	2.75	2.75	2.60	2.60	2.25	2.25	4.00	4.00	3.00	3.00	2.60	2.60
Total Amount of Bids		.....	$52,061.25	.....	$57,001.95	.....	$59,578.45	.....	$61,997.60	.....	$66,600.00	.....	$69,316.50	.....	$70,261.45	.....	$71,208.[illegible]

FOR IRON-PIPE SEWER.

BIDDERS.		Wellington & Madden, Waterbury.		J. B. Healy, N. Y. City.		Jas. Judge & Co., Jersey City.	
ITEMS.	Quantities.	Price.	Amount.	Price.	Amount.	Price.	Amount.
Cast-iron Pipe	625 l. f.	$8.25	$5,156.25	$8.50	$5,312.50	$11.00	$6,875.00
Cement-concrete Masonry	180 c. y.	5.00	900.00	5.50	990.00	8.00	1,440.00
Rubble-stone "	130 "	6.00	780.00	5.95	773.50	8.00	1,040.00
Split-stone "	30 "	9.00	270.00	6.00	180.00	12.00	360.00
Total Amount of Bids		.....	$7,106.25	.....	$7,256.00	.....	$9,715.00

The contract was awarded for brick sewers to W. E. Deane of N. Y., and for iron-pipe to Wellington & Madden of Waterbury.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Elm st, Nos. 143 and 145, br factory; cost $35,000; o, Van Zandt estate; a, John McIntyre; b, not selected....Water st, n s, 146 w Pike slip, br boiler house; cost about $10,000; o & b, Geo. V. Hecker; a, Wm. Field & Son....First av, w s, 8 br stores and ten; cost, ea, $12,000; o, Giblin & Taylor; a, Babcock & McAvoy; b, M. Giblin....48th st, n s, 6 br st ten; cost, ea, $13,000, o, John Livingston; a, F. T. Camp....11th av, s e cor 50th st, br office; cost $2,500; o, John H. G. Hildebrand; a, J. M. Foster.....56th st, n s, 275 w 8th av, br church; cost $55,000; o, Trustees of Church of Disciples of Christ, etc; a, Chas. Mettam; b, A. A. Andruss & Son and Christie & Dykes....14th st, n s, and 15th st, s s, 100 e 10th av, 2 br factories, cost $45,000; o, Messrs. Johnson & Lazarus; a, B. Balies; b, M. Reid and Steele & Costigan... 21st st, s s, 168 w 9th av, br lecture hall with st trimmings, cost $50,000; o, Gen. Theological Seminary, Prot Epis Church; a, C. C. Haight; b, J. Bogert and D. Hepburn....409-411 W 50th st, 2 br st ten; cost, ea, $12,000; o, John Tresch; a, Wm. Graul....89th st, s s, 210 e 3d av, 4 br ten, cost, ea, $17,000; o, Ph. Braender; a, J. Brandt..226-228 E 81st st, br ten; cost $40,000; o and a, same as last....163-165 84th st, br lofts, cost $10,000; o, Robert Murray; a, G. M. Walgrove..Av A, n e cor 119th st, br school; cost $125,000; o, City of New York; a, D. J. Stagg....70th st, n s, 150 w 1st av, br store and dwel; cost, abt, $7,500; o, W. Heagerty; a, A. Spence....126th st, n s, 88 w 5th av, br stable and dwel; cost $7,000; o, Lucien C. Warner; a, A. B. Jennings....126th st, s s, 95 w 6th av, 4 br st dwel; cost, ea, $17,000; o, Chas. Batchelor; a, W. F. B. Ferdon; b, not selected....128th st, s s, 225 w 7th av, 3 br ten; cost, ea, $25,000; o, H. Mulker; a, W. H. Hume; b, not selected...33 W 131st, 2 br st dwel; cost, ea, $9,000; o, Walter S. Price; a, Cleverdon & Putzel....82nd st, n s, 225 e 9th av, 6 br dwel; cost, ea, $11,250; o, Mrs. Mary M. Williams; a, D. Lienau; b, B. Blackledge and L. N. Williams...83d st, s s, 225 e 9th av, 6 br ten; cost, ea, $11,250; o, etc., same as last...61st, s s, 100 w 10th av, br ten, cost $12,000; o, Claus Ahreny; a, C. F. Ridder, Jr.; b, not selected...70 E 127th st, br stable; cost $700; o, G. W. Martin; a, G. Robingson; b, Barker & Smith and C. B. Brown... 8th av, w s, from 145 to 146th st, 15 fr stores and ten; cost, ea, $2,500; o, Nathan Hobart; a, T. M. Clark... 143 st, s s, 100 w 3d av, br ten; cost $12,000; o, George B. Whitfield; a, John Rogers....150th st, s s, 350 w Cortland av, fr ten; cost $5,000; o, Frank Knab; a, not selected.

ALTERATIONS, NEW YORK CITY.

61 Broad st, cor Beaver and Broad st, insert iron columns and girders, cost $10,000; o, Cath. T. Kunhard; a, Lederle & Co....279 Bowery, s e cor E Houston st, br exten; cost $2,500; lessee, George H. Werfelmann; o, W. A. Astor; a, W. Gral....169 109th st, br exten; cost $3,000; o, Hugh Coogau; a, A. Arktander....12 and 14 76th st, br exten; cost $5,000; o, William S. Maddock; superintendant, Maclay & Davies; b, not selected....68 Broadway, sub-basement made, also interior alter; cost $7,000; o, H. Kennedy; b, S. H. Mapes....18 Rose st, repair damage by fire, cost $4,750; o, Thos. H. Crosby; b, P. Donlon and R. E. Smith.

BROOKLYN.

Elm st, n s, fr dwel; cost, ea. $2,600; o and b, John Mitchell; a, W. Clement....Troutman st, s s, 125 e Evergreen av, fr ten, cost $4,000; o, Martin Schell; a, J. Platte; b; W. Rauth and P. Schell....Hancock st, s s, 470 e Bedford av, 5 br st dwel; cost, ea, $9,000; o, a and b, T. B. Jackson....4th st, s s, 9 Conn br st dwel; cost, ea, $5,000; o. Patrick Mullady; a, Parfitt Bros; m, not selected; c, Pat Ward....De Kalb av, n w cor Washington av, br st dwel; cost $10,000; o and c, D. H. Fowler; a, A. Hill....North 2d st, s s, 100.3 w 5th st, br shop; cost $9,600; o, F. Habermann; a, Thom & Wilson; b, J. McQuaid....Grand st, s w cor 5th, br store; cost $20,000; o, Mr. Constable; a, Herbert; b, not selected....Myrtle av, n s, 40 e North Portland av, 2 br st and flats; cost, ea, $13,000; o and b, John Gordon; a, R. Dixon.

ALTERATIONS, BROOKLYN.

9 Wyckoff st, add two stories; cost $2,500; o, George Kinkel; a, Charles Werner; b, Burns & McCann....307 Myrtle av, br exten; cost $2,500; o, Samuel W. Burtis; a and c, Geo. Sowden; m, J. W Campbell.

BALTIMORE, MD.—68 Hamburg st, s s, br build; o and b, L. Pearson, Sr....176 West Falls av, br build; o, Wm. H. Oler.. .111 Washington st, e s, br build; o, F. Schaff....Chase, s e cor Hillman st, br build; o, Wm. Schaffeld....Franklin st cor Chestnut alley, br stable; o, B. T. Bingham....Philpot st, n s, br build; o and b, Gillet & Mann... Eastern av, s e cor Chapel, br build; o, J. Rausch....Barker st, s s, two br build; o and b, F. Burger....Fairmount av, s s, three br build; o and b, F. Burger....251-253 Harford av, two br build; o and b, S. T. Edel....Light, s e cor Water st, iron warehouse; o, Johns Hopkins Hospital ...Fulton st, s s, fourteen br build; o and b, J. Q. Coding ...Balt. st, s s, three br build; o and b, J. Q. Coding....Elliott st, s s, br build; o and b, H. Weis ...Read, s w cor Charles st, br build; o, F. Brown...Bond st, s w, br build; o and b, H. Getting. .German, n w cor Calvert st, reconstruct build; o, Robert Rennert; a, E. Baldwin; b, H. Smith & Son....Holliday, n e cor Pleasant st, br build; o, S. Rosenberg.

BOSTON, MASS.—Elm Mill av, nr Crawford st, fr dwel; o, John T. Blinn; b, Benj, D. Whitcomb....*190 Benington st, fr dwel; o, Joseph Terry; Chas. E. Day....Saratoga st, n Moode st, fr dwel; o, and b, Edwin G. Turner....Webster av nr Eighth av, fr dwel; o, and b, Jacob W. Berry....Shancock st, nr Dochester av, fr dwel, o, Patrick Finnegan; b, W. Ryan....Commercial st nr Dorchester av, 2 fr dwell; o, L. E. N. Josus. ..Delle av, nr Parker st, fr dwel; o, Michael Cunningham; b, E. W. Bishop....Cottage st, nr Blook av, fr dwel; o, and b, Wm. W. Dromey....*30 Laurel st, fr dwel; o, and b, A. Anderson....Beard av, nr Butler st, fr dwel; o, Walter Brown; F. W. Servance....Mathew st, nr Dorchester av; fr dwel; o, Thomas Watson; b, John H. Burt & Co....*2 School st, fr dwel; o, Aaron Hook; b, Moses P. Bickford....Saratoga st, cor Wadsworth st, dwel & store; o, and b, Thos. K. Neoby....Warren st, nr Devon st, fr dwel; o, John E. Rinney; a, John H. Burt & Co....Whitney st, nr Tremont st, fr dwel; o, Arthur Morgan....Wales st, nr Blue Hill av, fr dwel; o, Staley D. Poole; b, John Harrison & Co....Warren av, nr Harvard st, fr dwel; o, James Nesbitt....Rossiter st, fr. dwel; o, Hazard Stevens; b, Sam'l T. Waters....Savin Mill av, fr dwel; o, Geo. C. Scott; b, D. A. Berry....Waverley st, nr Elm Mill av, fr dwel; o, Albert J. Foster....*20 Savin st, fr dwel; o, and b, W. A. Duncomson....Rockland st. nr Dale st, 2 br dwel; Frank Maynes; b, Andrew Anderson....*180 Endicott st, br dwel, store; o. John D. Connor....*187 West Chester Park, br family hotel; o, and b, D.H. McKay....*91 Oliver st, br store; o, A.W. Stetson; b, G. W. Pope....*28 and 30 Clark st, br dwel; o, Patrick Canny; b, D. Sullivan & Son.

CINCINNATI, O.—N E cor Bank and Deman st, br factory; cost $11,000; o, Mosler & Co; b, Blush & Co....Kemper Lane nr Windsor st, br dwell; cost $11,000; o, A. C. Richards; b, Stephen Richards....Canal nr Elm st, br dwell; cost $20,000; o, Strobridge & Co; b, Johnston & Carpenter....Central av nr 8th st, st front dwell; cost $15,000; o, Clemens O. S. Kamp; b, Henry Bevis....Oak nr Buckeye st, br dwell; cost $3,500; o, A. Brust; b, A. Ruby & Sons.

DETROIT, MICH.—Seventh st, three fr dwells; cost $10,500; b, Robert Bird....Sixth st, seven fr dwells; cost 12,000; b, J. F. Weber....Peterboro st, br dwell; cost $12,000; a, Mason & Rice. Joy st, 2 br dwells; cost $8,000; b, J. & H. Wagner....Sproat st, 5 br dwells; cost $19,000; b, W. H. Holland....Gratiot ave, 4 br stores; cost $5,700; b, H. Chapston.

KANSAS CITY.—Tenth cor Charlotte st, hospital; cost $30,000; o, K. C. Church Union.

RAVENSWOOD, ILL.—Eight frame dwells; cost $6,000; o, W. S. Bennett; a, W. Strippelman; b, Alex. M'Kay.

PHILADELPHIA.—Oregon st, 4,104, 6, 8, 3 dwels; b, E. J. Lynch....Wallace, w of 23d st, 2 dwels; b, Cook & Surman....Ottis st, s of Moyer, dwel; b, Brown & Englos....Orthodox E. Asylum road, dwel; b, E. S. Lewis ...Clinton st, bet Baker and Barr sts, 2 dwels; b, McLaughlin & McMamre....Mervin st, s of Columbia av, dwel; b, C. C. Caman....S w cor of 27th and Hitcher sts, 4 dwels; b, S. Stewart....North 37th st, 15, dwel, b, W. Bunch, Jr. N. College avenue, 2,507, dwel; b, J. Sims Wilson....S w cor of Emerald and Huntington sts, store and 5 dwels, b, S. Stenark....Baring st, w of 33d, dwel; b, G. McNichol....5th st, n of Butler, 2 dwels; b, C. Joss....Fleeson st, w of Ridge ave, 2 dwels; o, S. B. Righter....Parker ave, s side, 2 dwels; o, Amos Mattis. ..Sp. Garden, 4 dwels; b, J. R. Garber....West School, nr township line, dwel; b, J. A. Sorber....Pepper st, e of Seporia, 4 dwels; o, S. L. Kelly....Columbia ave, dwel; b, J. Klebe....N w cor Longshore and Dithian sts, school house; b, T. W. Sweed....Shore Lane, bet Pechin and Freedland, 6 dwels; o, W. H. Rainor ...Jefferson st, near Fowler, 3 dwels; b, K. Rowland....S 10th st, dwel; o, D. Merrige....Coulter, n of Pulaski, 8 dwels; o, C. B. Williams....E Montgomery ave, dwel; o, J. H. W. Chestnut....S w cor 10th and Buttonwood sts, dwel and store; b, H. Kolph...Wilder st, n side, dwel; o, J. Smith....N e cor 15th and Christian st, br church; b, M. McConnel....S e cor Tulip and Vienna, 2 dwels; b, J. M. Buchanan....Madison st, bet Emerald and Jasper, 12 dwels; b, D. Trainor....Van Pelt st, n of Bucks, 5 dwels; b, J. R. Pyle....Kimball st, w of 21st st, 6 dwels; b, R. Kaighn....Walter st, w of 15th st, dwel; o, W.B. Brady....Chatham st, s of Alleghany st, 3 dwels; o, J. Young....Warnock st, dwel; b. Shoenleber.

WASHINGTON, D. C.—Cor. 15th st, 3 story br, cost, $14,000; o, John Hockmeyer; a, S. R. Sumer....5th st, bet O & P. 5 2 story br, cost $10,000; o, A. Mausur, a, W. O. Dennison....S st, bet 12 & 13. 2 2 story br, cost 7,100; o, Geo. Francis; a, Peter McCartney....cor., H & N. Cap st, 3 story br, cost $5,000; o, S. Schofhert, a, J. F. Eberback....cor. 12 st, 4 2 story br, cost $10,000 o, P. Corcoran, a, P. Corcoran....Mass av, bet 17 & 18 3 story br, cost $9,000; o, M. Sherman & Co., a, C. C. Martin....15th st, 3 story br, cost $8,500; o, C. T. Murray; a, May Page....Morrison....No 5 Iowa Circle, 3 story br, cost $15,000; o, Partello; a, E. S. Frederick....15th st, bet R. & S. cost $6,000; May W. Clymer; a, R. S. Fleming.

CONSTITUTION AND BY-LAWS OF THE ASSOCIATION OF MASTER PLUMBERS OF THE CITY OF NEW YORK.

For the information of plumbers in other cities, who may be contemplating the forming of societies, we here print the Constitution and By-laws of the Master Plumbers' Association of this city.

ARTICLE I.

Name.

This Association shall be known as "The Association of Master Plumbers of the City of New York."

ARTICLE II.

Officers.

The officers of the Association shall consist of a President, three Vice-Presidents, a Treasurer, a Recording Secretary, a Financial Secretary, a Corresponding Secretary, a Sergeant-at-Arms, and three Trustees.

ARTICLE III.

Election of Officers.

The officers of the Association shall be chosen annually by ballot at the first meeting in January; and the respective persons having the highest number of votes shall be declared elected.

ARTICLE IV.

Duties of President.

The President shall have the general management of the Association, subject to the Constitution and By-Laws. He shall preside at all meetings of the Association, appoint all committees (except standing), see that the Constitution and By-Laws are enforced, and generally perform such duties as his position demands.

Duties of Vice-Presidents.

During the absence, illness, or disability of the President, each Vice-President (who takes precedence in the order of his election) shall have similar powers and duties.

ARTICLE V.

Duties of Recording Secretary.

It shall be the duty of the Recording Secretary to record the proceedings of the Association in books kept for that purpose, which he shall send or bring to every meeting, read and file all communications and other papers, keep a full roll of the members and their places of business, and perform such other duties incident to his office, as may from time to time be required of him.

ARTICLE VI.

Duties of Financial Secretary.

It shall be the duty of the Financial Secretary to keep a correct debit and credit account with every member of the Association, see that the dues and fees are kept paid up, receive and receipt for all moneys paid to the Association, and forthwith pay the same over to the Treasurer, taking his receipt therefor, and transact such other financial duties as may be required.

ARTICLE VII.

Duties of Corresponding Secretary.

It shall be the duty of the Corresponding Secretary to conduct the correspondence of the Association, notify members of the time and place of meetings, and also chairman of committees of such matters as may be referred to them, at the earliest moment thereafter, and such other duties as appertain to his office.

ARTICLE VIII.

Duties of Treasurer.

The duties of the Treasurer shall be to receive, through the Financial Secretary, all moneys accruing from every source to the Association, and pay over all sums above two hundred and fifty dollars to the Board of Trustees. He shall pay all bills against the Association, when duly authorized, and keep a full and accurate account of all moneys received and paid out by him. He shall pay out no money without taking a receipt for the same, and no bill or claim shall be paid by him unless approved by the Auditing Committee. He shall make a detailed and accurate statement of all receipts and expenditures for each quarter, at each quarterly meeting, and also a complete annual report and balance sheet at the close of the year.

ARTICLE IX.

Duties of Sergeant-at-Arms.

It shall be the duty of the Sergeant-at-Arms to guard the door at each meeting, and see that none but members of the Association, or authorized persons, are admitted, and fulfill such other functions as may be required of him by the presiding officer.

ARTICLE X.

Duties of Trustees.

The duties of the Trustees shall be to have charge of the library, corporate seal, and other property of the Association. They shall also receive from the Treasurer, and deposit in bank, at interest, all moneys above two hundred and fifty dollars. They shall withdraw no money from bank unless duly authorized, and then only by checks, signed by the President, Treasurer, and Chairman of the Board of Trustees. They shall have the duty of providing, by lease or otherwise, the apartments or premises required by the Association; and the employment of such necessary assistance, or purchase of material, subject to the approval of the Association. They shall make an annual report to the Secretary of State, as required by law, on or before the 24th day of December of each year.

ARTICLE XI.

Committees.

The Association shall have the following standing committees: the Executive, the Auditing, and the License committees.

ARTICLE XII.

Duties of Executive Committee.

The Executive committee shall be composed of all the officers of the Association, and of which the first Vice-President shall be chairman. Its duties shall be to examine into charges preferred against members, call special meetings whenever it may be deemed expedient, and exercise general supervision over the affairs of the Association, when such is not inconsistent with the Constitution and By-Laws.

ARTICLE XIII.

Duties of Auditing Committee.

The Auditing committee shall be composed of three members chosen by ballot at the annual election. It shall examine the current accounts and bills, the quarterly and annual reports of the Treasurer, the books of the Financial Secretary, and such other financial business as may be referred to it.

ARTICLE XIV.

Duties of License Committee.

The License committee shall consist of three members, chosen by ballot at the annual election, whose duties shall be to examine and report on all applications for license at the Department of Public Works.

ARTICLE XV.

Vacancies in Offices or Committees.

Any vacancy that may occur in any of the offices or committees shall be filled for the unexpired term by the presiding officer.

ARTICLE XVI.

Qualification of Members.

All plumbers, who have a license from the Department of Public Works of this city, and are creditably conducting business in a permanent location, are eligible for membership in this Association. This applies also to plumbers who are partners of members as well as to those conducting the business in permanent locations in surrounding cities and towns where licenses are not required, and then only within such limits as may be governed by the convenience of the applicant, and such distance from the city as may be deemed proper.

ARTICLE XVII.

Election of Members.

The name of any person wishing to join the Association must be proposed by a member. The proposal shall state his full name and place of business, be accompanied by the initiation fee, and then be referred to an investigating committee of three, appointed by the presiding officer. If the report be favorable, action shall be taken at the meeting next following by ballot. One-tenth of the votes, cast adversely, shall constitute a rejection of the candidate.

ARTICLE XVIII.

Duties of Members.

Every member, on his election, shall be required to sign the roll. He shall receive a certificate of membership, a copy of the Constitution and By-Laws, and pledge himself solemnly to abide by them, and also pursue such honorable line of conduct as is expected from members of respectable organizations.

ARTICLE XIX.

Honorary Members.

Honorary membership may be conferred in exceptional cases on persons who may be deemed worthy of the compliment. The person proposed shall have his name submitted to the Executive Committee, and if unanimously recommended it shall then be referred to the Association at a meeting, of which four weeks' notice shall be given. Three adverse ballots at the election shall constitute a rejection.

ARTICLE XX.

Initiation Fees and Dues.

The initiation fee shall be ten dollars; quarterly dues, two dollars; payable in advance.

ARTICLE XXI.

Alterations and Amendments.

All proposed alterations or amendments to the Constitution shall be submitted to the Association in writing, at a regular meeting and then lie over until the second meeting following. Due notice, containing copy of such alteration or amendment, shall be mailed to each member, at least one week previous to the meeting at which action is to be taken thereon. Such alterations or amendments must be sustained by a three-fourths vote of the members present.

ARTICLE XXII.

Quorum.

Fifteen members present at any meeting shall constitute a quorum for the transaction of the business of the Association.

BY-LAWS.

ARTICLE I.

Time of Meetings.

The regular meetings of the Association shall be held on every Friday evening. Special meetings may be called by the President or Executive Committee, or at the written request of five members. The hour of meeting shall be 8 o'clock, P. M. The quarterly meetings shall be held on the first Fridays after the first Mondays of the months of January, April, July and October. The annual meeting shall take place at the first quarterly meeting of the year.

ARTICLE II.

Order of Business.

After the meeting has been called to order by the presiding officer, the following order of business will be observed:

1. Calling of the roll of officers and standing committees. Absences will be noted by the Recording Secretary.
2. Reading of the minutes of previous meeting.
3. Collection of dues; this order of business may be proceeded with at any time during the evening.
4. Reports of standing and special committees.
5. The election of officers and committees on the first Friday after the first Monday in January, as provided for in Article III of the Constitution.
6. Unfinished and miscellaneous business.
7. Communications.
8. Proposals for membership.
9. Election of new members.
10. New business.
11. Adjournment.

ARTICLE III.

Order of Debate.

While a motion is under debate another motion shall not be entertained, unless it shall be:

1. To lie on the table, upon which the question shall be taken without debate.
2. To amend.
3. To reconsider.
4. To substitute another proposition.
5. To move the previous question, which shall cut off all debate, if carried.

ARTICLE IV.

Trial of Members.

If a member be charged with violating any article of the Constitution or By-Laws, or, conduct unbecoming a gentleman, or prejudicial to the welfare of the Association

(Continued on page 494.)

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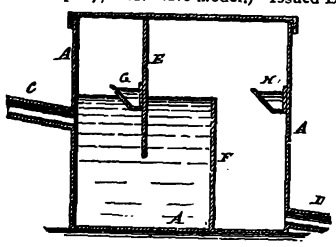
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

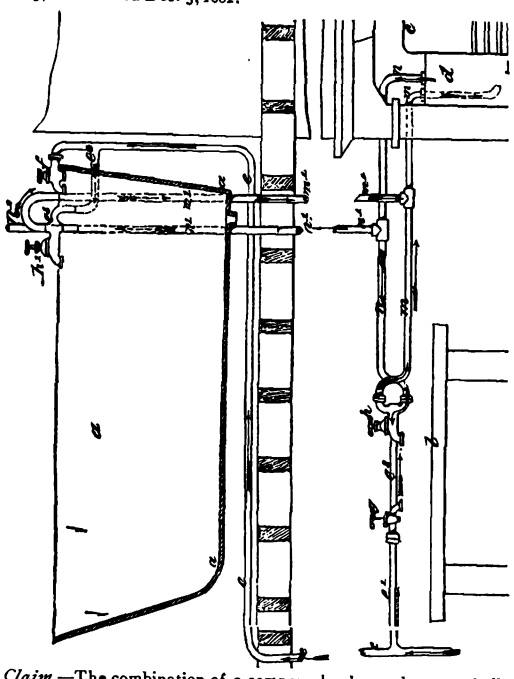
[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

268,584. SEWER-GAS TRAP. MOSES T. WILLIAMS, Riverside, Conn. Filed Sept. 7, 1882. (No model.) Issued Dec. 5, 1882.



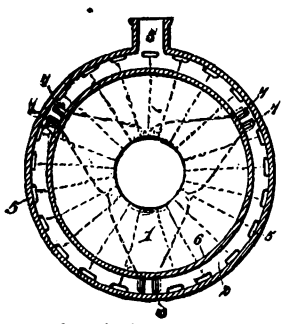
Claim.—In a sewer-gas trap, the combination, with the trap A, provided with a seperable cover, B, and divided into three compartments by the upper and lower partitions, E F, of disinfectant vessels G H, substantially as herein shown and described, whereby sewer gas passing through or generated in the trap will be prevented from entering the building, as set forth.

268,663. WATER FITTINGS. JOHN R. HARGREAVES, Haslingden, County of Lancaster, England, assignor to Thomas Duckworth, Waterford, near Manchester, England. Filed July 31, 1882. (No model.) Patented in England Nov. 23, 1881, No. 5,111. Issued Dec. 5, 1882.



Claim.—The combination of a compound valve and a water boiler, with a cold water supply pipe leading to the boiler through passages in said valve, and a hot water distributing pipe leading from said boiler, and having an outlet through said valve, all substantially as described, whereby on the opening of the valve cold water will be admitted to the boiler as the hot water is withdrawn.

268,740. FLUSHING-BASIN FOR WATER CLOSETS. BENJAMIN C. SMITH, New York, N. Y., assignor to Fred. Adee, same place. Filed Sept. 19, 1882. (No model.) Issued Dec. 5, 1882.



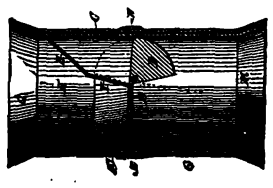
Claim.—1. A water closet basin constructed to deliver therein a main flushing stream or streams of water, and provided with an oblique passage or passages formed through the bottom wall of an annular channel or rim at the top of the basin to introduce a current or currents or water, and by such oblique arrangement of the passage or passages, deflect the water on the main flushing stream or streams to oppose or interrupt the course of the same through the basin, substantially as described.

2. A water closet having at its upper edge an orifice to deliver therein the main flushing-stream of water, and an annular channel or hollow rim, the bottom wall of which is formed with passages which extend through the said bottom wall in an oblique direction, substantially as described.

3. A water closet basin having at its upper edge an orifice to deliver therein the main flushing stream of water, and an annular channel or hollow rim, the bottom wall of which is provided with pairs of passages 7, each pair of which extends through said bottom wall in lines which diverge from each other toward the bottom of the basin, substantially as shown and described.

268,821. DUST AND SEWER TRAP. HENRY PENNIE, Brooklyn, N. Y. Filed March 10, 1882. (No model.) Issued Dec. 12, 1882.

Claim.—1. The combination of the conduit C, the valve E D, constructed substantially as described, the flange F, and the shield or hood H I, extending over the valve-joint, substantially as and for the purposes set forth.

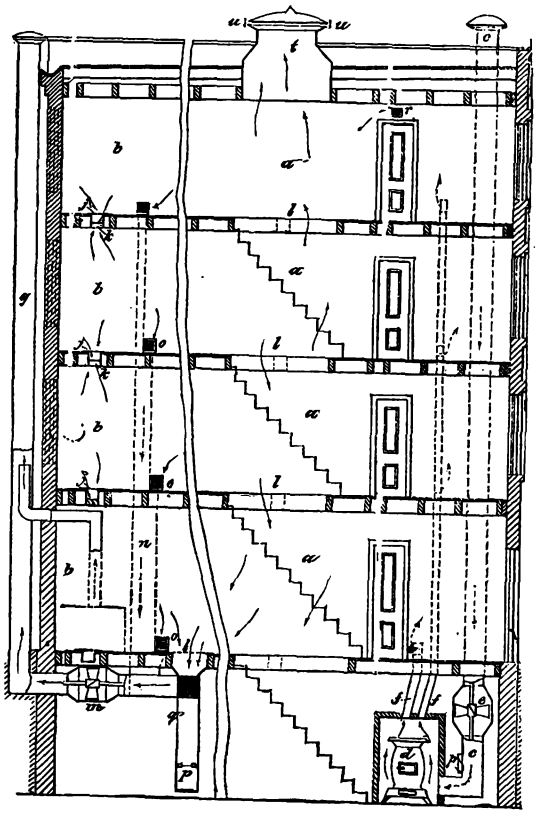


2. The combination of the conduit C, the valve E D, constructed substantially as described, the beveled bearing-flange F, and the hood or shield H I, provided with a beveled or inclined upper surface and extending over the valve joint, substantially as and for the purposes set forth.

3. The combination of the conduit C, flanged at both ends, as shown, the valve E D, the beveled bearing-flange F, and the hood or shield H I, provided with a beveled or inclined upper surface, substantially as and for the purposes set forth.

4. A trap consisting of the pipe or conduit section C, provided with flanged ends, beveled flange F, and inclined hood or shield H I, cast in a single piece, and the valve D E, cast in a single piece, substantially as described, the pipe-section and valve being united by the valve rod or axle running through the strengthening band N substantially as and for the purposes set forth.

268,822. VENTILATION. WILLIAM A. PITT, New York, N. Y. Filed July 16, 1881. (No model.) Issued Dec. 12, 1882.



Claim.—1. In ventilating buildings, the combination of a foul-air shaft, extending into the cellar of the house and com municating therewith by means of an opening in the floor of the lower hall, with an air passage arranged in the floor of each hall communicating with the adjoining room and with the room below it, and with a propeller arranged within said shaft, whereby the heavy and vitiated air from the several rooms is discharged into the halls at the lowest level, and is drawn down and exhausted at the lowest point in the building, substantially as set forth.

2. In means of ventilating buildings, the combination and arrangement of an air-outlet provided in the floor of the room communicating directly with an opening in the floor of the adjoining hall, and a similar outlet provided in the ceiling of the room similarly communicating with the hall above, whereby the foul and superheated air from the top and bottom of the room may escape into the halls on the lowest level, substantially as set forth.

3. The combination of the shafts *c* and *g*, provided with the doors *p* and register-opening *i*, with the flues *ff* and connecting flue *n*, all arranged and operating in the manner and for the purpose set forth.

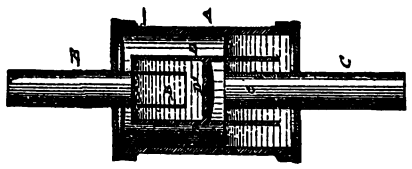
4. The combination of a fresh-air shaft and foul-air shaft, adapted to exhaust and discharge from the lowest point in the building, with a ventilating-dome provided with one or more valves, whereby a direct current can be induced from the top to the bottom of the house through the halls, substantially as described.

5. The combination of the foul-air shaft *g*, propeller *m*, register-opening *i*, and air-outlets *j k*, all arranged in the manner and for the purposes set forth.

6 In ventilating buildings, the combination of the supply and exhaust shafts *c* and *g*, propellers *e* and *m*, flues *ff*, outlets *j k*, and register- opening *i*, substantially as set forth.

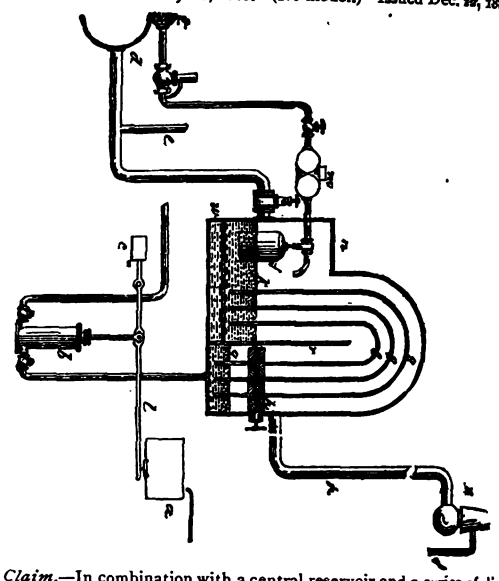
7. The combination of the foul-air shaft *g*, register-opening *i*, outlets *j k*, and pipe *s*, substantially as and for the purpose described.

268,865. SEWER-GAS TRAP. HENRY R. CASSEL, New York, N. Y. Filed April 29, 1882. (No model.) Issued Dec. 12, 1882.



Claim.—A sewer-gas trap consisting of an exterior chamber, into which the induction and eduction pipes terminate, and of an interior cylinder of less height than the exterior chamber, said cylinder having a transverse diaphragm intermediately between the ends of the induction and eduction pipes, substantially as and for the purpose set forth.

268,878. PROCESS OF AND APPARATUS FOR DISTRIBUTING LIQUID FUEL IN CITIES. CYPRIEN M. TESSIE DU MOTAY, Paris, France, and EDWARD STERN, New York, N. Y., (Benjamin F. Lee, New York, N. Y., Administrator of said Du Motay, deceased;) said Stern assignor to Benjamin F. Lee, New York, N. Y., Ancillary Administrator of said Du Motay, deceased. Filed May 26, 1880. (No model.) Issued Dec. 12, 1882.



Claim.—In combination with a central reservoir and a series of distributing-pipes conveying liquid fuel to the different houses of a city or town, apparatus arranged in the different houses for vaporizing each a portion of said liquid fuel, and a pump and pipes for returning the heavier portions of said fuel to the general circulation, substantially as set forth.

2. The combination, in a town heating and lighting system, of a central reservoir of liquid fuel, a double series of pipes, one of which supplies the liquid fuel to the different consumers of the town, and the other of which supplies compressed air or gas, and carburetors at the different places to be heated or lighted, constructed to carburet the compressed air so delivered by means of the liquid fuel delivered by the fuel-supply pipes, substantially as described.

8. The method of supplying heating or illuminating gas to consumers in a city or town, herein described, which consists in supplying to each house the fuel in a liquid condition from a central source, and then carbureting air delivered in each house by said fuel, substantially as described.

268,860. SECONDARY BATTERY. ASAHEL K. EATON, Brooklyn, N. Y., assignor of two-thirds to William Wallace and Thomas Wallace, both of Ansonia, Conn. Filed Apr. 15, 1882. (No model.) Issued Nov. 28, 1882.

268,368. GAS-REGULATOR. GRIFFIN S. LACEY, New York, N. Y., assignor, by mesne assignments, to the American Gas Saving Company, same place. Filed Oct. 12, 1882. (No model.) Issued Nov. 28, 1882.

268,378. GAS-LAMP. RICHARD PINTSCH, JULIUS PINTSCH, and OSCAR PINTSCH, Berlin, Germany. Filed Apr. 15, 1882. (No model.) Issued Nov. 28, 1882.

268,384. STEAM TRAP. JAMES H. BLESSING, Albany, N. Y. Filed Oct. 19, 1882. (No model.) Issued Dec. 5, 1882.

268,389. MEANS FOR CARRYING AND CONDUCTING ELECTRIC WIRES. WILLIAM M. CONWAY, Baltimore, Md. Filed Feb. 9, 1882. (No model.) Issued Dec. 5, 1882.

268,411. MOVABLE DAM. ARTHUR KIRK, Sharpsburg, Pa. Filed May 31, 1881. (No model.) Issued Dec. 5, 1882.

268,412. SMOKE CONSUMER FOR FURNACES. THOMAS KIRKWOOD, Chicago, Ill. Filed Aug. 16, 1882. (No model.) Issued Dec. 5, 1882.

268,419. UTILIZING EXHAUST STEAM. HARVEY T. LITCHFIELD, Hull, and DAVID RENSHAW, Cohasset, Mass. Filed Aug. 3, 1881. (No model.) Issued Dec. 5, 1882.

268,428. FEEDING AIR TO FURNACES. CHARLES MCWILLIAM and EMILE LOISEAU, Montreal, Quebec, Canada, assignors to William Alexander Campbell and George Hutton Patterson, both of same place. Filed Sept. 15, 1882. (No model.) Issued Dec. 5, 1882.

268,429. STEAM BOILER AND OTHER FURNACES. WILLIAM J. O'NEAL, Cincinnati, Ohio, assignor of one-half to Joseph C. Boone, same place. Filed April 27, 1882. (No model.) Issued Dec. 5, 1882.

268,435. LIQUID PUMP. HERMAN F. SCHWUCHOW, Chicago, Ill., assignor to Edward T. Mason and Frank A. Bergman, same place. Filed April 20, 1881. (No model.) Issued Dec. 5, 1882.

268,467. TANK SPOUT. JACKSON H. DUNLAP, Turloch, assignor of one-half to William Wilkinson, Los Gatos, Cal. Filed Aug. 26, 1882. (No model.) Issued Dec. 5, 1882.

268,580. HEATING APPARATUS. CORYDON WHEAT and ALFRED CATCHPOLE, Geneva, N. Y. Filed March 15, 1882. (No model.) Issued Dec. 5, 1882.

268,581. PUMP. JOSIAH A. WHITMAN, Cranston, R. I. Filed Mar, 28, 1882. (No model.) Issued Dec. 5, 1882.

268,615. HEATING FURNACE. GEORGE R. BROWN, Corning, N. Y. Filed Aug. 23, 1882. (No model.) Issued Dec. 5, 1882.

RE-ISSUE.

10,255. STEAM PUMPING MACHINERY. WILLIAM E. WORTHEN, New York, N. Y. Filed Oct. 4, 1882. Original No. 192,042, dated June 12, 1877. Issued December 5, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING APRIL 14th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough
NORTH ATLANTIC CITIES.																							
Portland.....Maine								3															
Boston.....Mass	407,581	201	25.6	68	33 8	6	1	33	3	5	6	2	2		2	20		11		1	1		
Cambridge.....Mass	57,432	21	19.0	4	19.0			4							1	2							
*Worcester.....Mass																							
New Haven.....Conn	66,979	26	20.2	8	30.7			2								6							2
Providence.....R. I.	116,755	53	23.6	8	15.0	1		5		1			8			13		2					
Total	683,266	312	23 7	88	28.2	7	1	47	3	6	6	2	10		3	41		13		1	1		2
EASTERN CITIES.																							
Albany.....New York	98,430	33	17.4	11	33.3	1		7	1	1		1	2		1	4		2					
New York.....New York	1,299,249	721	28 8	275	38.1	25	4	128	23	7	20	5	5	6	13	130		43		29	10		8
Brooklyn.....New York	633,763	263	21.5	93	35 3			34	5	1	8	3	3	3	17	45		19	1		2		3
Hudson Co.....New Jersey	228,025	105	23.9	40	38 0	2		12	2		2		1		8	23		3	1		8		1
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	15	14.4	2	13.3			3	1				2	1									
Paterson.....New Jersey	58,324	24	21.4	6	25.0	2	1	5	1						2	3	1	2					
Philadelphia.....Pa.	907,043	417	23 9	110	26.3	2	1	76	5		14	2	17	1	9	45	8	11		1		2	1
*Reading.....Pa.																							
Wilmington.....Delaware	46,886	29	32 1	11	37.9			1		1	1		1		1	2						1	
Total	3,325,735	1,607	25.1	548	34.1	32	6	266	38	10	45	11	31	11	51	252	9	80	2	30	20	3	13
LAKE CITIES.																							
*Buffalo.....New York																							
Rochester.....New York	92,116	50	28.2	12	24.0	3		6			1					9		5					
*Syracuse.....New York																							
Cleveland.....Ohio	192,084	47	12 7				2	4	1	1	3			1	2	4	2	1					1
Detroit.....Michigan	131,118	57	22.2	25	43.8		2	6			1				1	8		3			1		1
Chicago.....Illinois	597,834	232	20.2	113	48.7	7	2	22	3	9	8	4	5		10	26		10			1	2	1
Milwaukee.....Wisconsin	135,233	58	22.2	28	48.2	1		3	1		6				2	2		1	1	1			2
Total	1,056,385	444	21 8	178	40 0	11	6	41	5	10	19	4	5	1	15	49	2	20	1	1	2	2	5
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	75	20.3	22	29.3	6	2	12		1		1	4		1	9	2	3					2
Cincinnati.....Ohio	267,767	121	23.4	55	45.4	2		22	2		2	1	3		9	20	1	4	1	1	1		2
Dayton.....Ohio	41,648	14	17.5	3	21.4		2	3					1			1							1
Louisville.....Ky	131,529	66	26 1	21	31.8			13					4									11	
Indianapolis.....Indiana	86,529	26	15.6					4		4			1			2	1	1			1		
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	30	15.9	10	33.3		3	6	1		2	1	4			3		1			1		
*St. Paul.....Minn																							
*St. Louis.....Mo.																							
Total	817,022	332	21.1	111	33.4	8	7	60	3	5	4	3	17		10	35	4	9	1	1	3	11	5
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.. " " Wh.	136,471	43	16.4	7	16.2			8				1			4	3	1			1			
" " Col.	71,103	40	29.2	25	62.5			9		2			1		1	6	4						2
Richmond, " Va. Wh.	38,526	16	21.4	11	68.7		1				1		1			1		1					
" " Col.	29,394	26	46.0	8	30.7	2		5		1						2							
Charleston " S. C. Wh.	22,699	8	18.3					2								2	1						
" " Col.	27,595	26	49.0	7	26.9			5					1	2		2							
Atlanta " Ga. Wh.	25,583	6	12.1	3	50.0											1				2			
" " Col.	19,221	11	29.8	6	54 5	1		1								2				1			
*Savannah " Ga. Wh.																							
" " Col.																							
Nashville " Tenn. Wh.	31,993	13	21.1	3	23.0			1		1					1					1		3	
" " Col.	19,406	14	37.5	4	28.5			4								2		1				2	
Memphis " Tenn. Wh.	18,677	8	22.2			1										3							
" " Col.	14,896	18	62.5	5	27.7	1		3								2	1						
*Mobile " Ala. Wh.																							
" " Col.																							
*New Orleans " La. Wh.																							
" " Col.																							
Total White	273,949	94	17.8	24	25.5	1	1	11		1	1	1	1		5	10	2	1		4		3	
Total Colored	181,615	135	38.7	55	40.7	4		27		3			2	2	1	16	5	1		1		2	2
Total in 30 U. S. Cities	6,337,972	2,924	24.0	1004	34.2	63	21	452	49	35	75	21	66	14	85	403	22	124	4	38	26	21	27
Mar. 31—Total in 28 English Cities	8,620,975	4,826	29.2			146				37	23		60		73					80		1	132
Mar. 31, " 8 Scotch Cities	1,233,088	722	30.4			20				18	13		13		6	200				23			43
Mar. 24, " 16 Irish Cities	854,731	571	34.7			10		66		11			6		10	168				4		1	16
Mar. 31, " 16 " "	854,731	661	40.2			4		81		14	1		7		10	186				5			24
Mar. 10, " 166 German Cities	8,737,203	4,281	25.5	1850		93		701	38	155	157		38		77	547				31	24	3	47
Mar. 17, " 171 " "	8,737,151	4,691	27.9	2071		83		776	35	172	197		55		76	682				58	21	4	60

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an urban population of 6,337,972, their died during the week ending April 14, 2,924 persons, which is equivalent to an annual death rate of 24.0 per 1,000, a decrease from the preceding week, for which it was 24.9

For the North Atlantic cities the rate was 23.7; for the Eastern cities 25.1; for the lake cities 21·8; for the river cities 21.1; and in the Southern cities for the whites 17.8 and for the colored 38.7 per 1,000.

Of the whole number of deaths 34.2 per cent. were under five years of age, the proportion being as usual highest in the lake cities (40.0 per cent.), and among the Southern colored (40·7 per cent). Accidents caused 2.1 per cent. of all deaths.

Consumption caused 15.4 per cent. of all deaths, as against 13.8 per cent. for the preceding week. In the North Atlantic cities it caused 15.0; in the Eastern cities 16.5; in the lake cities 9.2; in the river cities 8.0; and in the Southern cities for the whites 11.7 and for the colored 20.0 per cent.

Diphtheria caused 2.5 per cent. of all deaths. In the North Atlantic cities it caused 1.9; in the Eastern cities 2.8; in the lake cities 4.2; in the river cities 1.2; and in the Southern cities 1.0 among the whites and none among the blacks.

Typhoid fever caused 2.2 per cent. of all deaths. In the North Atlantic cities it caused 3.2; in the Eastern cities 1,9; in the lake cities 1.1; in the river cities 5.1; and in Southern cities, among the whites 1.0 and among the colored 1.4 per cent.

Scarlet fever caused 2.9 and measles 1.2 per cent. of all deaths.

Pneumonia caused 13.4 per cent. of all deaths, the highest ratio being in the Eastern cities, where it caused 15.6 and the lowest, in the river cities, where it caused 10.5 per cent. In New York city it caused 18, and in Brooklyn 17 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 26 new cases of diphtheria, 21 of scarlet fever, six of typhoid fever and one of small-pox.

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PITTSBURGH, PA.—Dr. Wm. Snively reports two new cases of small-pox.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 28 new cases of scarlet fever and 16 of diphtheria, making 59 of the former disease remaining under treatment and 21 of the latter.

DETROIT, MICH.—Dr. O. W. Wight reports eight new cases of diphtheria and 18 of scarlet fever.

EVANSVILLE, IND.—In his report dated April 14, Dr. Charles E. Lining states that according to a census lately taken, by order of the Legislature, the voters in the city number 8,316, which would give a population of over 40,000.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports three deaths during the week, two of which were deaths of children. Cerebro-spinal meningitis is one of the causes specified.

PROVIDENCE, R. I.—Dr. E. M. Snow says in his report for the week ending April 14: "The number of deaths for the week was considerably less than for the week previous, but is still above the average for the city. The cases of typhoid fever, as well as the deaths, seem to be decreasing."

BALTIMORE, MD.—The annual death rate for the week ending April 14 was, according to the local health board, for the whole population, 21.23; for the whites 17.43, for the colored, 43.33 per 1,000. The number of deaths reported was 167; males 80, females 87; under five years 58, over 60 years 36. Violence caused three deaths, consumption 17, croup three, diarrhœa one, diphtheria nine, malarial fever one, scarlet fever five, pneumonia 19, bronchitis three, measles two, and small-pox seven.

NEW YORK LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports 11 admissions, three deaths and three discharges during the week, leaving 1,349 insane patients under treatment in the Asylum.

NEW YORK QUARANTINE.—During the week ending April 13 there were taken from 20 immigrant steamers nine cases of measles, two of scarlet fever, one of typhoid fever and one of small-pox. The small-pox patient (from the *S. S. Wieland*) was 22 years of age and had been vaccinated when 10 years old. The ship's surgeon vaccinated 853 persons on board, but only six of his operations were successful. These people were re-vaccinated at the quarantine station, and a communication was sent to the steamship company, illustrating by this the economy there is in efficient work in the matter of vaccination by the surgeons of vessels.

MICHIGAN.—Dr. H. B. Baker reports the prevalence of the following diseases during the week ending April 7: rheumatism, neuralgia, bronchitis, consumption, intermittent fever, influenza, and pneumonia. Diphtheria was reported present at 13 places, scarlet fever at 18 places, and measles at 24 places.

HUDSON CO., N. J.—The report of C. J. Rooney, Jr., for the week ending April 7, came too late for insertion in our table. Deaths from all causes, 105; deaths under five years, 40; accidents two, consumption six, croup two, diphtheria two, typhoid fever one, scarlet fever eight, pneumonia 23, acute bronchitis 3, pleurisy one, puerperal diseases eight, and whooping cough one.

C. J. Rooney's report for the month of March, which will be tabulated hereafter, shows that the county death rate, 24.4, is one-half of one per cent. higher than the average of March during the six preceding years. The rate, however, has been very variable, ranging from 19.6 in 1878 to 31.3 in 1881. The increase is equivalent to about one hundred deaths per annum, and it occurred among persons over five years of age. No one cause was especially prominent. Croup, diphtheria, scarlet fever and consumption gave higher figures than their averages.

SAN FRANCISCO, CAL.—Dr. J. Hoesch, Secretary Board of Health, reports 86 deaths for the week ending March 31. Of these, 22 were of children under five years of age. Accidents caused four of the deaths, consumption 15, croup one, diarrhœal diseases four, typhoid fever two, pneumonia nine, acute bronchitis two, and puerperal diseases three.

During the month of February there were 399 deaths as against 509 during the corresponding month of 1882; males 260, females 139; under five years, 86; over 60 years, 57. Population, stated according to 1880 census, Caucasians 212,520, Chinese 22,000; total, 234,520. Croup caused five deaths, diphtheria one, diarrhœal diseases seven, erysipelas four, puerperal fever five, typhoid fever six, malarial fever two, consumption 85, bronchitis 14, congestion of lungs three, pneumonia 60, and violence 16. No death is recorded from cerebro-spinal meningitis, measles, whooping cough or small-pox.

NEW ORLEANS, LA.—The Board of Health report for the week ending April 7 has just been received. The present estimated population is given at 223,555, of which number 163,606 are white, and 59,949 colored. The deaths numbered 196; white 102, colored 94; under five years, white 28, colored 29; annual rate for the whites, 32.42; for the colored, 81.54; for the whole population, 45.59.

White: Small-pox caused 32 deaths, scarlet fever two, typhoid fever one, malarial fevers two, diarrhœal diseases one, consumption eight, croup one, pneumonia four, and violence two.

Colored: Small-pox caused 54 deaths, or 57.4 per cent. of the total mortality, malarial fevers two, consumption six, bronchitis three, pneumonia four, diarrhœa one, and violence two.

ONTARIO, CANADA.—The *Provincial Bulletin* for the week ending Apr. 7, shows the prevalence of bronchitis, influenza, measles, neuralgia, anæmia and intermittent fever. Measles has receded considerably during the week. Anæmia, which appears so frequently in this *Bulletin*, is defined to be "a condition in which, while there may be no actual localized disease, there is yet a general debility arising from impoverished blood, which places the system in a position peculiarly susceptible to any *specific* morbid influences to which it may at any time be subjected. The influence of unsanitary methods of living—as improper food, impure water and unventilated dwellings—in producing this condition has been so clearly demonstrated that the attention of the general public cannot be too frequently called to the fact, inasmuch as it is often the first stage, followed by some zymotic or other specific disease, too frequently of a fatal character."

ENGLAND.—The Registrar General's return for the week ending March 24, a summary of which was tabulated in our issue of last week, gives 26.1 as the average annual rate of the 28 great towns. The lowest rate was registered in Derby, viz., 18.9, and the highest in Hull, viz., 32.9. No death was referred during the week to any of the principal zymotic diseases, either in Derby or in Huddersfield. The highest rates from whooping cough were in Hull and Bolton, from scarlet fever in Leeds and Sheffield, and from measles in Norwich. Small-pox caused three deaths in London, four in Newcastle-on-Tyne and one in Leeds.

LONDON.—Births 2,466. Deaths 1,887. The births were 314 below and the deaths 56 above the average numbers in the corresponding periods of the last ten years. Annual mortality rate 24.9. Small-pox caused three deaths, measles 36, scarlet fever 29, diphtheria 14, whooping cough 32, typhus two, typhoid fever 14, and diarrhœa and dysentery 18.

The English returns for the week ending March 31, shows that the average rate in the 28 large towns increased to 29.2. Bradford recorded the lowest rate, 21.1, and Manchester the highest 39.8. No death was recorded in Norwich from any of the principal zymotic dieases. Hull Plymouth and Leicester gave the highest rates from whooping cough; Sheffield and Leeds the highest from scarlet fever; and Sheffield and Manchester the highest from measles. Small-pox caused one death in Sunderland, but not one in any of the 27 other towns.

SCOTLAND.—Consul A. J. Leonard, of Edinburgh, sends the return of the registrar-general for the week ending March 31st. The death rate in the 8 principal towns was 30.4 per 1,000, or 8 4 above that for the corresponding week of last year, and 2.0 above that for the previous week of the present year. Edinburgh presented the lowest rate, viz., 20.7, and Greenock the highest, 38.5. Whooping cough was the most fatal epidemic.

EDINBURGH.—Total mortality, 94; rate, 20.7. No death was registered as caused by small-pox or scarlet fever. Measles caused 1 death, diphtheria 4, whooping cough 4, typhoid fever 2, diarrhœa 1, acute lung diseases 29, and violence 5.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return the registrar-general for the week ending March 24, for which see table above.

DUBLIN.—Total mortality, 258; rate, 38.4; small-pox, scarlet fever, and diphtheria none, measles 1, typhus 8, whooping cough 11, typhoid fever 4, diarrhœal diseases 6, consumption 36, acute lung diseases 69, and violence 8.

BELFAST.—Total mortality, 117; rate, 28.4; small-pox, typhus, typhoid, diphtheria, and violence none, measles 1, scarlet fever 8, whooping cough 3, diarrhœal diseases 2, consumption 12, and acute lung diseases 39.

The return for the week ending March 31 has also been received.

DUBLIN.—Total mortality 279; rate 41.5; small-pox, measles, scarlet fever, and diphtheria caused no deaths. Typhus fever caused 8 deaths, whooping cough 14, enteric fever 3, diarrhœa 4, consumption 32, acute lung diseases 74, and violence 3.

PARIS, FRANCE.—During the week ending March 29 there were 1,303 deaths in Paris; males 723, females 580; under five years 391, over 60 years 288. Annual rate 30.23. Typhoid fever caused 30 deaths, small-pox 12, measles 41, scarlet fever 3, whooping cough 11, croup and diphtheria 40, dysentery 3, erysipelas 6, puerperal infection 4, consumption 260, acute bronchitis 45, pneumonia 128, and violence 28.

There remained under treatment in the hospitals on March 25, 110 cases of small-pox, 252 of typhoid fever and 34 of diphtheria.

RHEIMS, FRANCE.—Consul John L. Frisbie sends report for the week ending March 24, showing a mortality of 59; under five years 21, over 60 years 13. Annual rate 32.70. No death was registered as caused by small-pox, whooping cough scarlet fever, erysipelas, or violence. Croup and diphtheria caused 5 deaths, measles 2, typhoid fever 1, bronchitis 9, pneumonia 4, consumption 10, diarrhœa 1, and puerperal infection 1.

Consul Frisbie states that the sanitary condition of the city is good, and that the authorities take a commendable interest in its improvement. Pulmonary diseases have been very fatal, owing to the unusually cold and wet season.

BRUSSELS, BELGIUM.—In the city and its suburbs there were 204 deaths during the week which ended March 24; under five years 86. Annual rate 23.8. Small-pox caused one death, measles four, scarlet fever two, typhoid fever two, croup three, whooping cough two, diarrhœa and dysentery 21, bronchitis and pneumonia 39, and consumption 28.

COPENHAGEN, DENMARK.—There were 122 deaths during the week ending March 20, of which 56 were of children under five years, and 24 of persons 60 years and upwards. This mortality is equal to an annual rate of 24.76 per 1,000. No death was registered from small-pox, measles, croup, typhoid fever, erysipelas or puerperal fever. Scarlet fever, diarrhœa and diphtheria caused one death each; whooping cough nine, consumption 19, pneumonia 10, bronchitis 10, pleurisy one, and violence two.

During the same week the following cases were reported: small-pox one, measles three, scarlet fever 18, diphtheria 10, croup three, whooping cough 63, typhoid fever seven, diarrhœa 71, erysipelas 22, bronchial catarrh 400, pneumonia 52, and quinsy 142.

STOCKHOLM, SWEDEN.—Consul Elfwing transmits the report for the week ending March 17, showing 109 deaths, equal to an annual rate of 32.6 per 1,000; males 52, females 57; under five years 49, over 60 years 19. Measles caused four deaths, scarlet fever one, whooping cough one, croup and diphtheria seven, typhoid fever one, diarrhœa six, consumption 16, pneumonia 15, bronchitis eight and violence seven.

(Continued from page 491.)

in any respect, his case shall be submitted to the Executive Committee, which shall render its decision to the Association, and if he should be found guilty by a majority of said committee, he may be censured, suspended, or expelled by an affirmative vote of two-thirds of the members present.

ARTICLE V.

Notice of Charges.

No member shall be tried upon any charge without having had mailed to him a copy of the same at least ten days prior to the investigation.

ARTICLE VI.

Dropping from Roll.

Any member in arrears on the books of the Association for twelve months shall have no voice or vote at any meeting until the liability be settled, and may be dropped from the roll by a majority vote of the members present, if due notice of his indebtedness shall have been served upon him one week prior to such action.

ARTICLE VII.

Resignation of Members.

Resignation from membership shall be made in writing and be addressed to the President, who shall refer it to the Financial Secretary. No member shall be considered as having resigned unless he has paid his dues in full to the Association, and given proper notice to the President as before mentioned.

ARTICLE VIII.

Re-instatement of Ex-Members.

Persons who have resigned from membership or whose connection with the Association has been severed from any cause whatsoever, can only be re-instated by compliance with Article V. of the Constitution.

ARTICLE IX.

Change of Business Location.

Members are required on changing their places of business to notify the Secretary within a reasonable length of time.

ARTICLE X.

Rights of Members in Work.

No member of the Association shall complete any work undertaken by another member without the consent of the latter, or the approval of a committee to be appointed by the President for that purpose. Nor shall any work be appraised—whether finished or unfinished—in the absence or without the consent of the party originally interested.

ARTICLE XI.

Employment of Apprentices.

No member shall employ any helper or apprentice who has previously worked for another plumber, without the written recommendation of the latter.

ARTICLE XII.

Vacancies in Offices and Committees.

Any officer or member of a standing committee of the Association absenting himself for two months in succession, except in case of illness or other valid reason, shall have his position declared vacant by the Executive Committee, and it shall be filled as provided for in Article XV. of the Constitution.

ARTICLE XIII.

Speakers' Limits.

No member shall be allowed to speak more than once on any question, or at a greater length than five minutes, if objection be raised.

ARTICLE XIV.

Suspension of Constitution or By-Laws.

Any article of the Constitution or By-laws may be suspended during the meeting by unanimous consent.

ARTICLE XV.

Alterations and Amendments.

Any alteration or amendment to the By-laws may be effected according to the method prescribed in Article XX. for alterations or amendments to the Constitution.

ARTICLE XVI.

Parliamentary Usage.

The meetings of the Association shall be conducted according to parliamentary usage, as laid down in *Cushing's Manual.*

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FOURTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH, LUNACY AND CHARITY OF MASSACHUSETTS. Boston, 1883. CXCIX. 104, 174 pp., 8vo.

This volume contains an interesting historical summary of the organization of the Board with an appendix containing the statutes relating to health, lunacy and public charity, and the decisions of the Supreme Court of Massachusetts relating to the same, forming a manual for the use of the boards of health and overseers of the poor of the State.

The greater part of the report is occupied with matters pertaining to the charities of the State and the care of the insane. Eighteen pages are devoted to the subject of public health. As regards small-pox it is stated that "the presence of small-pox in Massachusetts is due to three distinct causes: contagion from immigrants at our ports, paper rags, and the Canadian immigration by land. During the past year we know of its appearance in thirty cities and towns, but in three places only did it make serious headway, and even there it was checked after fifty or sixty people had been attacked. The sum paid or due by the State from the cases originating from this source alone for the past year will not fall short of $9,000, and may exceed that sum." The whole number of cases in the State was about 400 and the number of deaths 36. The disease appears to have been promptly and efficiently dealt with wherever it made its appearance, and the Board has good reason to congratulate itself and the State upon the results obtained.

As regards questions of public water supply, it is remarked that the attempt to secure definite information as to the water supplies of the State by means of circulars sent to the various cities and towns has not been attended with success, which is by no means surprising. It is also stated that "this Board has been anxious to make a very thorough study of the various forms of vegetable and animal life found in fresh waters. * * * Such study invokes the co-operation of a number of persons of peculiar scientific training, and the Board has not yet succeeded in finding them." We "deeply sympathize" with the anxiety of the Board on this subject, and hope that the health of its members has not been injured by their fruitless efforts to find men competent to make such investigations.

Attention is called to the evils of overcrowding, more especially in tenement houses, and it is recommended that there should be a general law on the subject, applicable throughout the State, similar to that now in force in the City of Boston, but with such modifications as the experience of this and other countries may suggest.

The appendix of statutes and decisions, forming a manual for the use of boards of health, is a convenient and useful compilation, with a good index.

On account of the reported existence of yellow fever in Cuba and other southern islands, the National Board of Health has decided to establish quarantine stations on the Southern coast earlier than usual this year.

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For forms of proposals and all information, apply at this office.

G. WEITZEL,
Lieut. Col. of Engineers, U. S. Army.

NOTICE TO CONTRACTORS.

The Board of Commissioners of Porter County, Indiana, will receive proposals until two P. M., May 24, 1883, for the erection of a Court House in the city of *Valparaiso*. The plans and specifications can be seen at the Auditor's office in Valparaiso, and at the office of J. C. Cochran, architect, No. 78 Ashland Block, corner Clark and Randolph streets, Chicago. Contractors can obtain printed instructions as to requirements and form of proposals, upon application to the auditor or architect.

[Signed] L. P. SCOTT, N. PICKRELL, F. BURSTROM, } *Board of Commissioners.*

[Attest] W. E. BROWN, *Auditor Porter County.*

PROPOSALS FOR IRON RAILING AT ST. LOUIS, MO.

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., *April* 14, 1883.

Sealed proposals will be received at this office until 12 M., on the 4th day of May, 1883. for furnishing and fixing in place complete, the iron railing for areas of the Custom House, etc, Building at *St. Louis, Mo.*, in accordance with drawing and specification, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

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Proposals will be received by Board of Administrators, Insane Asylum at Jackson, Louisiana, until 12 o'clock, May 6, 1883, for 235,000 feet of dressed and undressed lumber. For particulars, address,

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For the grading and masonry of the extension of the Bangor and Piscataquis R. R., from Blanchard to Moosehead Lake, 14 miles, will be received until May 10. Address,

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For building an iron superstructure of a bridge over Duck Creek, Columbia Township, Ohio, will be received until May 12, 1883. For particulars, address,

W. O. CAPPELLER,
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For furnishing all material and constructing a system of water works in the City of Maquoketa, Iowa. To 1 P.M. May 1. For plans, etc., address, CITY CLERK (as above).

The Department of the Interior will receive proposals for following work and all material: Excavating about 9,000 cubic yards of material; for building a wall on both sides of Hot Springs Creek, requiring about 3,100 cubic yards granite masonry; for laying about 1,900 cubic yards of concrete; for putting down about 5,560 feet of earthernware sewer pipe, 12 inches in diameter; for laying about 1,200 feet of 6-in. iron pipe: Plans and specifications can be had from

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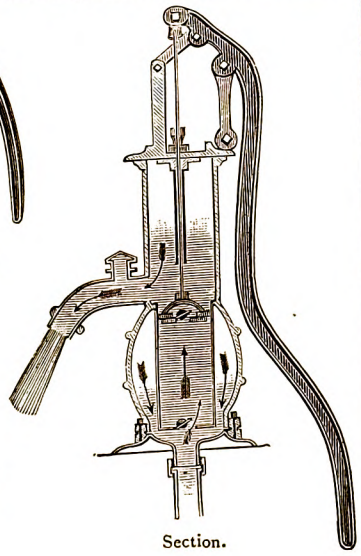

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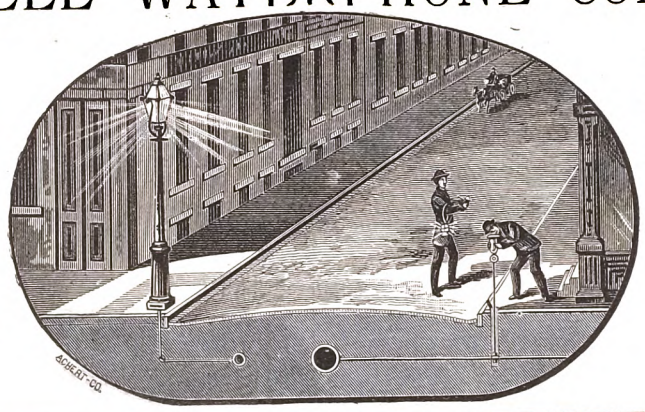

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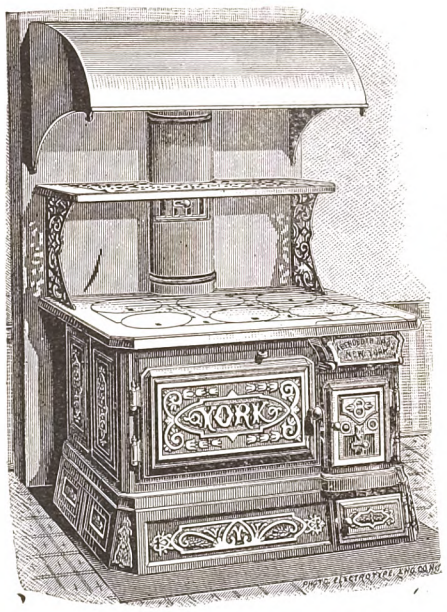

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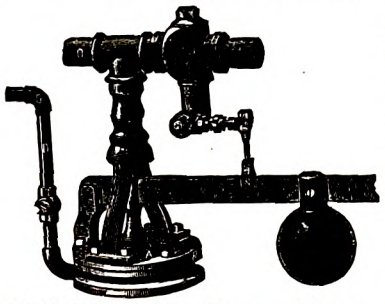

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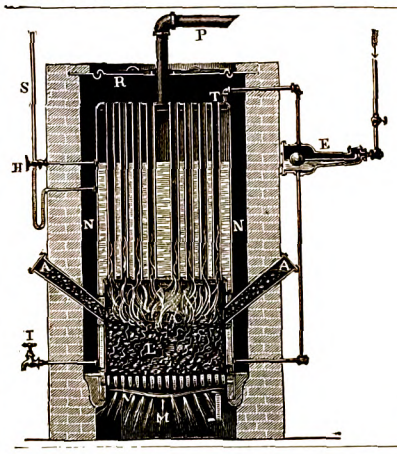

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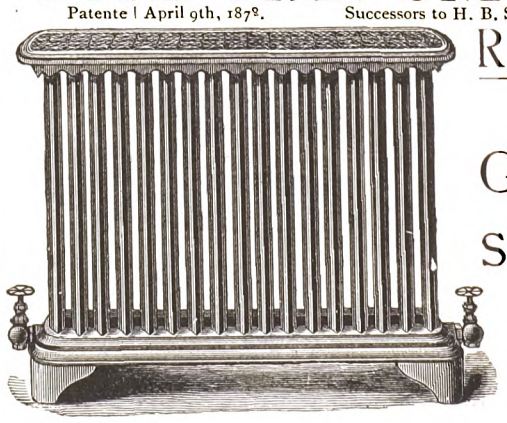

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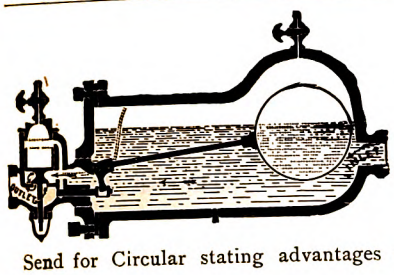

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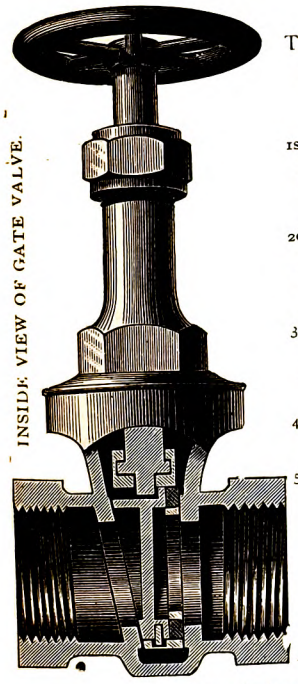

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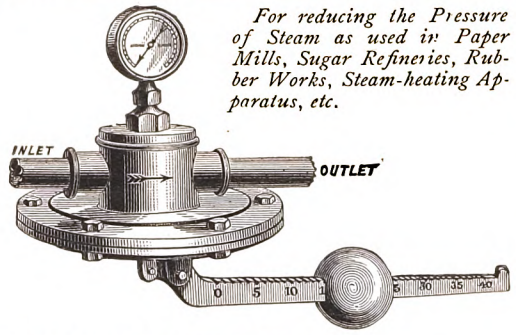

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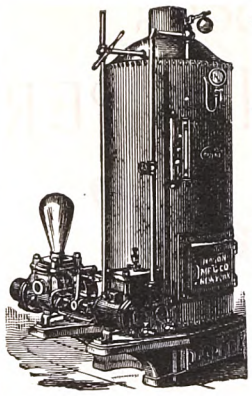

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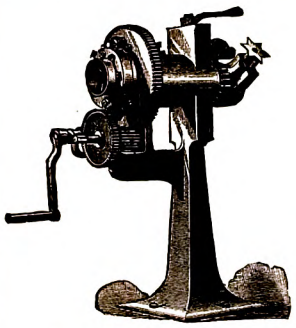

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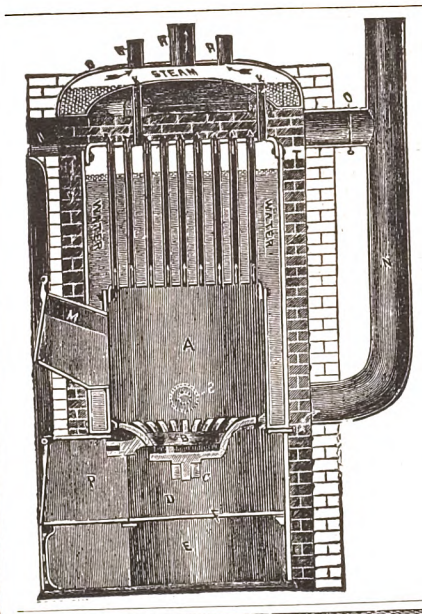

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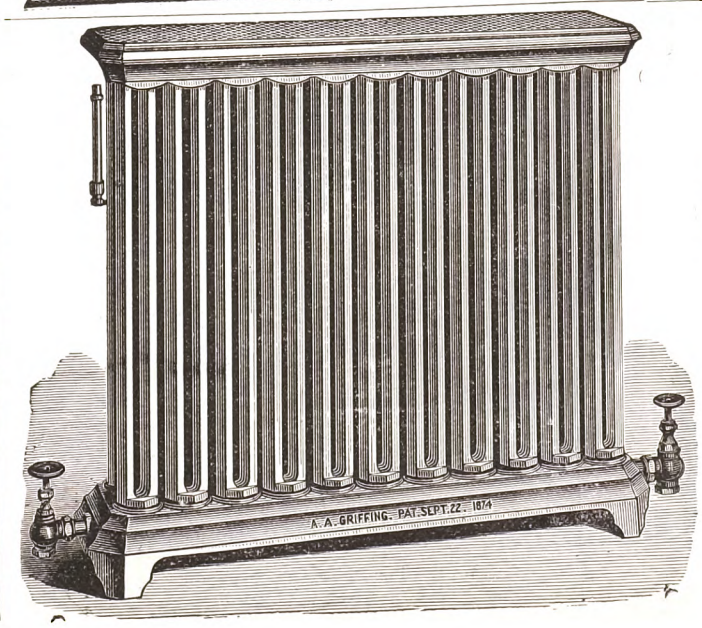

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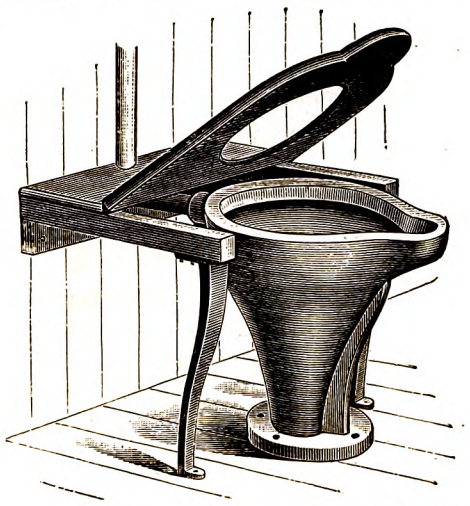

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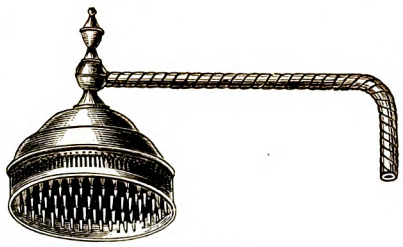

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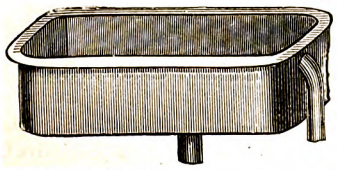

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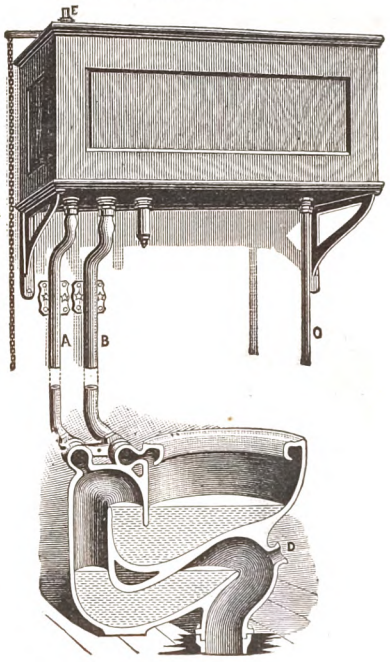

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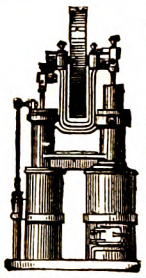

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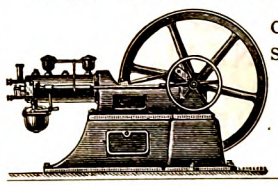

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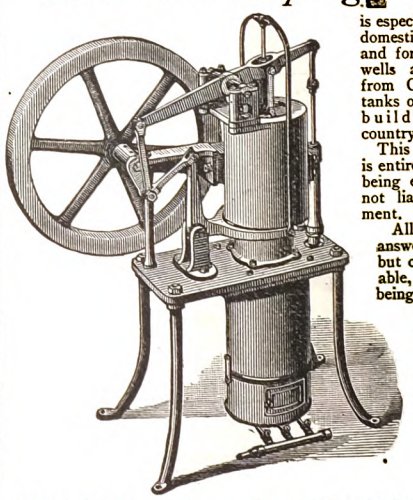

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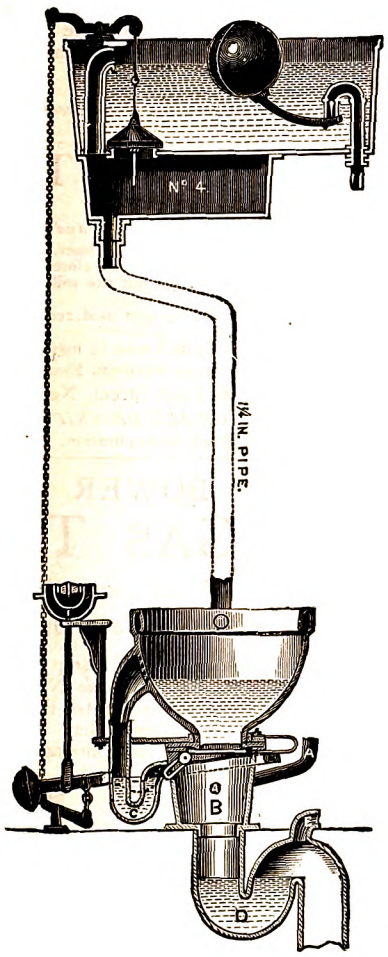

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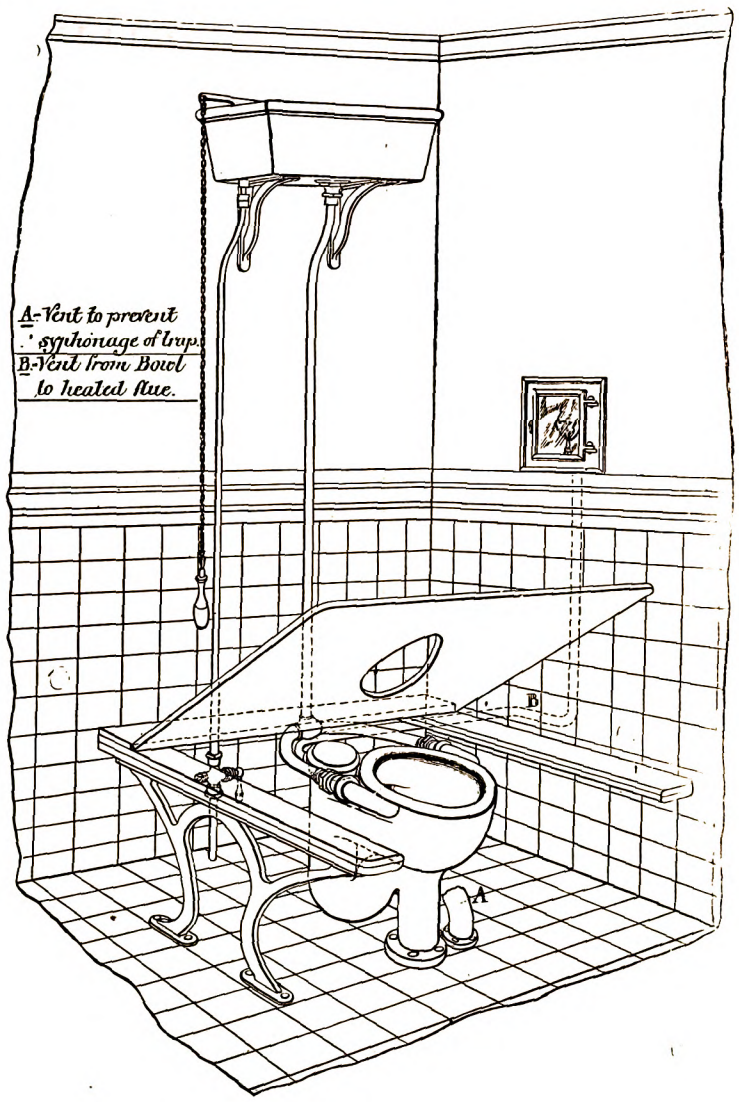

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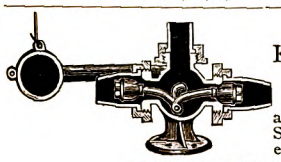

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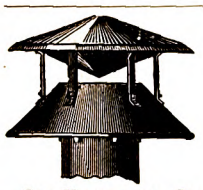

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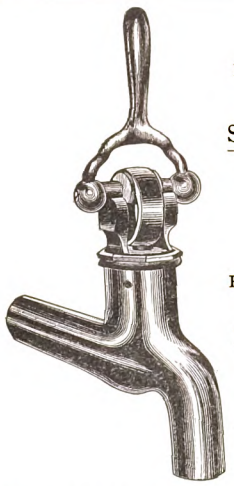

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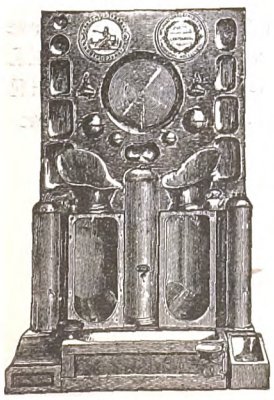

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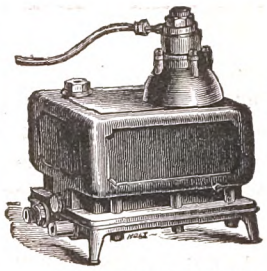

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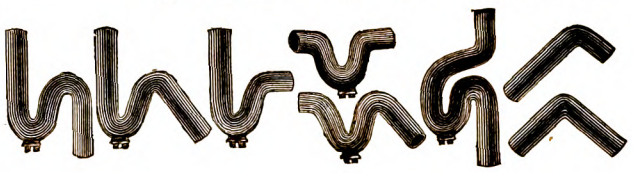

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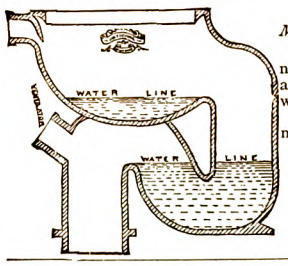

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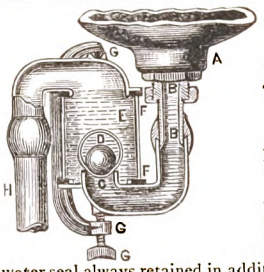

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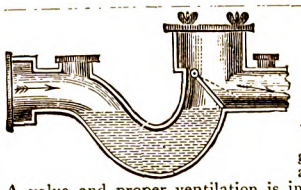

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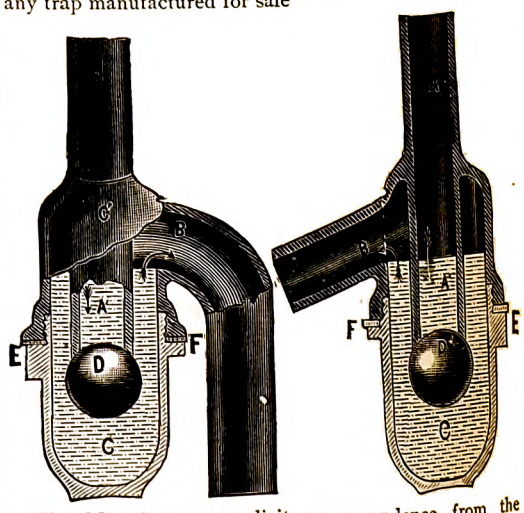

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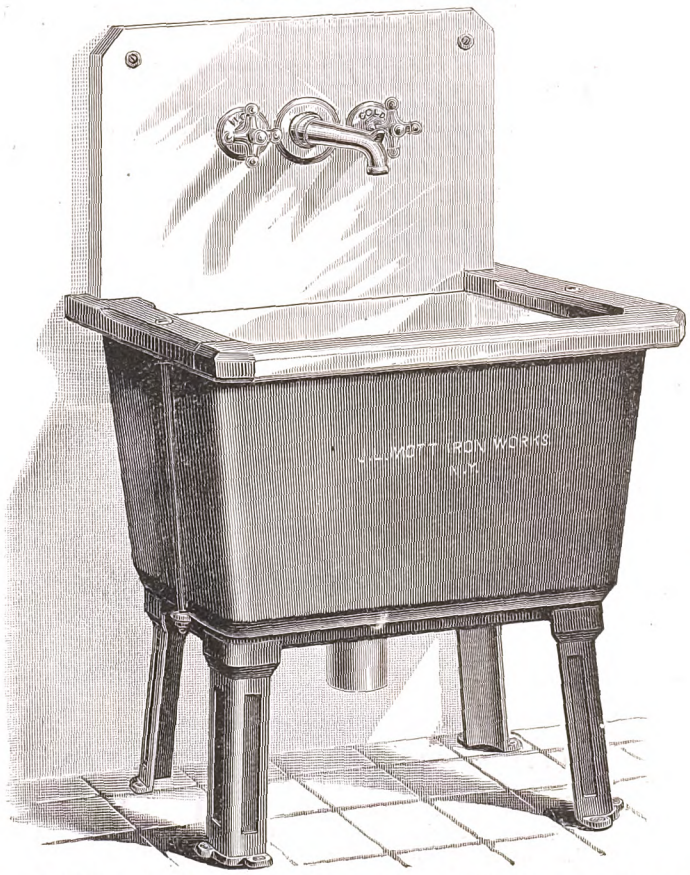

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SANITARY LEGISLATION IN NEW JERSEY.

We print elsewhere copies of recent sanitary legislation in New Jersey, from which it is evident the State Board of Health has a very considerable influence in the Legislature of that State. This is as it should be, and we congratulate the Secretary of the Board, Dr. Hunt, upon the fact.

To what extent these laws can and will be executed is, of course, uncertain. There is no doubt that cigarette smoking is injurious to boys, but we shall be surprised to hear of any convictions under the law as it is framed, and we very much doubt the practical utility of legislation of this kind. How can it be proven that the dealer knew the boy's age, unless it was his own son! We are glad to learn, though, that the State Board are in no way responsible for this measure.

The bill giving supplementary powers and duties to local boards is one of which it is very difficult to judge, as it turns largely upon technicalities of Jersey justice.

We have followed copy exactly in Section 6 of this bill, although the idea that a board of health should have authority given to it to prohibit a contagious disease is something new. Probably it was the public funeral which it was designed to prohibit, but to effect this the wording and punctuation of the law must be changed.

The law would seem to confer ample powers on local boards to suppress nuisances and to deal with contagious diseases. It gives such boards the authority at their option of enforcing compulsory notification of such diseases from physicians. This act carries out the principle of local government almost to an extreme, and a full and accurate report of the results obtained from it would be very instructive.

With regard to the supplementary act to prevent the adulteration of food and drugs, the close of the sixth section, which provides that the penalty shall be paid to the person bringing the suit, seems to be a very doubtful expedient, since it tends to create a class of professional informers who will bring the whole matter into discredit.

It is, moreover, not clear to us how Section 8 is to be carried out. Is any officer of any local board of health to have the power to stop the transit of any articles of food or drugs? According to this section, any such officer in New Jersey has power to inflict great annoyance and loss on merchants and on the great corporations for inland transportation whose lines cross the State.

The principle of this section is thoroughly bad. Honest and intelligent business men are willing to intrust a State Board of Health with great power, believing that it will be wisely used to protect, not only the health, but the commercial interests of the community, but will be very unwilling to have every county and township official intrusted with the same power under the stimulus of giving the fines to the informers.

If, moreover, the policy of the State Board of Health is to be that announced by its Secretary, as given in THE SANITARY ENGINEER of April 19, viz.: to pay no attention to commercial frauds, and to look only after adulterations harmful to health, then the honest manufacturers, dealers and consumers must seek protection from another organization, and in that case it will be the State Board of Health that will suffer.

It seems to us to be an exceedingly unwise policy on the part of State Boards of Health to attempt to shirk the responsibility placed in them by laws regulating the adulteration of food and drugs, and to confine themselves to the health aspects of the problem.

No doubt it requires tact, energy and courage to deal with fraud, but the Board which shows that it possesses these qualities can command the influence of honest business men, and that influence is omnipotent when brought to bear upon legislation.

Increased mortality among the insane in the Blockley Almshouse, Philadelphia, in 1882, soon led to a report by Dr. Richardson, physician in charge, to the Guardians of the Poor, in which he states that escape of sewer gas into the ventilators gave a typhoid character to all diseases. He reports that the sewage from nearly 100 persons was dumped into the cellar from which the air supply was drawn. He also found that the buildings were not properly warmed, the reason being that the boilers were in such condition that the inspector refused to permit a sufficiently high temperature to be carried to produce the necessary heat.

We should be glad to know who is responsible for this disgraceful condition of things. Have they another "Tewksbury" establishment in Philadelphia?

We print elsewhere a translation of a paper on the Separate System of Sewerage, by Prof. R. Baumeister, Professor of Civil Engineering in Polytechnic School of Carlsruhe, Germany, printed in the "Viertel Jahrschrift für Oeffentliche Gesundhietspflege." This is a valuable contribution to the subject, and we commend its perusal to our readers as the views of a gentleman who has evidently considered the question without bias.

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The New York Board of Trade and Transportation, at a meeting held April 28th passed resolutions endorsing Mayor Edson's bill for the proposed aqueduct. The chairman was authorized to appoint a committee to go to Albany and watch the progress of the bill.

THE DIRECTION OF SANITARY WORK IN A GROWING COMMUNITY.

PORTLAND, OREGON, *April* 4, 1883.

To the Editor of THE SANITARY ENGINEER:

Portland, Oregon, is situated on the bank of the Willamette River, twelve miles above its junction with the Columbia, and 100 miles from the ocean. Its population is between 25,000 and 30,000, and is increasing very rapidly. The streets run parallel, and at right angles with the river. From the river the streets have a gradual rise toward the hills behind the city. Through the northern and lower part of the city run two creeks which are streams of pure water on entering, but in their passage through the city become open sewers. In the same part of the city is situated Couch's Lake, which although gradually being filled up, is at present, and especially at the lowest stages of water in the river, a stagnant swamp, covered with rank weeds, and poisoning the air with their noxious gases.

The only system of sewerage which the city has, is a series of sewers 18 or 20 in number, having no connection with each other, running down the streets at right angles with and into the river. They are all pipe sewers from 9 to 16 inches diameter. Yearly we have in June freshets, when the river sometimes rises 29 feet above low water, and at those times, for two months, the sewers are nearly all filled with water over half their length.

The greater part of the city is, however, outside of this sewerage system, and there the people have to depend upon cesspools which are dug down to a gravel or water bearing strata, to prevent them from filling up. I am very sorry to say, that in utter disregard of all sanitary laws, a large number of our inhabitants have wells, and use water for all purposes from the same source, well and cesspool very often only a few yards apart.

We have a private water company, which supplies very good water which is pumped from the river above the city, and away from all contamination with the sewers. This summer the works are to be extended with another pumping station ten miles further up the river. The health of the city is generally good, although we have sometimes slight epidemics of scarlet fever and diptheria.

We have no board of health or city engineer, but all ordinances in regard to health or drainage are left to the chief of police, or street superintendent to enforce. I anticipate your advice in matters of this kind, for the city to employ a first-class engineer to examine into and construct a system of sewerage best suited to our situation and requirements, but it is very hard to impress such upon our city fathers, so I hope by your making some comment on this letter they may be brought to see the error of their ways. Yours truly, W.

No rules of universal application are known to us by which a young, vigorous and growing community, which as yet has had but little sickness, and, in fact, does not recognize that it has any, can be induced to take timely measures to prevent soil and water pollution, until the evil results of neglect become so manifest in the form of disease and death, that they can be no longer ignored.

Nevertheless it is now, we think, in most cases, possible to get intelligent people to take an interest in the matter if one goes to work in the right way.

There ought to be little difficulty in getting fifty prominent citizens of Portland to form a citizens' sanitary association.

Let the objects of this association be to investigate the sanitary needs of the city, and to have given a course of ten lectures upon sanitary matters. The main thing is to make a beginning, the association will find plenty to study, and plenty to do, and its members will find the subject full of interest.

Let it be evident that the association does not exist for the purpose of grinding anybody's individual axe; that it does not start out with a fixed programme for reforming everything and everybody, but that it proposes to study the subject, obtain reliable information as to what is best to be done, and to endeavor to create an intelligent public opinion with regard to it.

One of the first things with regard to which information will be desirable is the amount and character of the diseases prevailing in different parts of the city, and the first step toward securing this is to establish a system of registration of deaths.

Such a system is necessary to prevent concealment of crime, and to ensure the means of proof of right to property; and there should be little difficulty in securing the passage of the necessary city ordinance to obtain it.

The essential principles of such an ordinance are simple and well known. No burial should be allowed without a permit from an officer of the city, and any attempt at a burial without such a permit should be regarded as furnishing good grounds for suspicion that the death was not due to natural causes, and as calling for a coroner's inquest.

Before such a permit is given a certificate should be required from the parent or householder giving the name, sex, age, residence, birth place, conjugal condition, occupation, residence, and place and date of death of the deceased, with a certificate from the attending physician as to the cause of death.

This registration of deaths is the foundation of sanitary work, and is the first thing to be secured.

It is unnecessary to indicate the various subjects which this sanitary association will find it expedient to investigate through committees and otherwise.

Undoubtedly the question of the disposal of sewage will be one of those, and, undoubtedly, also it will be highly desirable to obtain the advice of a skilled engineer upon this subject; but that will come in due time.

The first thing to be done is to get the intelligent thinking portion of the community, the successful business men, the physicians, editors, clergymen, lawyers, etc., etc., to look into this matter for themselves, and determine whether anything ought to be done. When they have looked into the matter, and become acquainted with the actual condition of things, and the probable results, the rest follows, as a matter of course.

Portland is too important a city, and has too much at stake to be without an intelligent active health officer, and no doubt, the sanitary association will so determine. But it is as well to have the educational process go on for awhile before such an officer is appointed.

Meantime we shall be glad to hear occasionally from Portland, and to learn that the question of prevention of disease has been considered by her citizens of sufficient importance to demand investigation.

Mr. Isaac G. Perry, of Binghamton, has been appointed by Governor Cleveland Commissioner of Construction of the new Capitol.

Dr. F. E. Englehardt recently submitted to the Syracuse Board of Health a plan by which he claimed the city could obtain a supply of pure milk. He would require each dealer to take out a license, costing him $5. This license shall contain full information regarding the number of cows supplying the milk, where kept, etc. He suggests that milk from different farms be sold from different cans; that the sale of skimmed milk be allowed, provided the cans containing it are properly marked; and that no dealer be allowed to sell milk from a farm on which a contagious disease has broken out. It is proposed to adopt the lactometer used by the Board of Health of this city.

The *Nashville American* suggests that in extension of water and gas pipes, they should be laid in the alleys through blocks instead of in the streets, and thus avoid the annoyance caused by "the street car companies, the gas company and the water works department digging up the middle and both sides of the street from the beginning to the end of the year."

The plan is well worth considering in towns which are laid out with alleys in the rear of the houses in every block, as so many southern and western towns are.

THE SEPARATE SYSTEM OF SEWERAGE.*

The drainage and sewerage of towns by means of underground conduits has up to the present time almost always been effected by delivering to such conduits *all* water to be removed, *i.e.*, waste water from households and manufacturing establishments, surface water from streets and yards, sometimes subsoil water, together with human excreta. The principle of the *separate system* consists in constructing a complete network of sewers (brick and pipe) for *household wastes only*, sometimes including excrements, while rain-water, snow, etc., are separately removed, partly on the surface, partly underground, the subsoil water being also separately carried off by means of drain tiles.

This principle was first carried out, although most always in a somewhat modified form, in a number of English towns, of which the more noted instances are Alnwick, Reading, Oxford, Dover. The rain-water, however, from roofs and yards is admitted into the system of waste water sewers, in order to flush it out occasionally, while the removal of surface water from the streets is mostly effected by open gutters. In Halstead the hydrants are connected with the upper dead ends of the sewer system in order to effect a *regular* flushing.

In America, too, it was at first supposed with regard to the separate system of sewerage that it would be inexpedient to exclude all rain water, since no artificial flushing could be as efficient as the occasional introduction of a large quantity of rain-water.† But the difficulty herewith encountered was overcome by the invention of Rogers Field's automatic flush-tank, which is placed at the upper end of all branch sewers, is fed from the public water supply, and can be utilized for the regular flushing at any desired interval of the whole system. In consequence of this invention the principle of the separate system was carried out with full force. The principal advocate of this system is Col. George E. Waring, Jr., of Newport, R. I., who has treated this subject in numerous articles, at public meetings, and in plans carried into execution.

Following this brief introduction the writer brings a detailed description of the Memphis sewerage system, which we omit as well known to the readers of THE SANITARY ENGINEER. Then follows a more critical examination into the merits of the separate system, as compared with the combined system, which, coming as it does from a reliable and fully impartial critic, well deserves our attention.

I. VELOCITY OF FLOW REQUIRED TO REMOVE DEPOSITS:

The quantity of sewage proper of a given area is so small as compared with the volume of water from heavy rainfalls (it varies from 1-5 to 1-30 according to local circumstances) that the cross section of *combined* sewers is utilized only little during dry weather. A shallow, sluggish stream of water moves along the sewer invert and is apt to deposit suspended matter and to create obstructions more or less large, which are readily increased, whenever a stoppage occurs anywhere, and which are removed only at the next rainfall. Meanwhile, of course, decomposition begins, which may be of little importance when a good ventilation of the sewers is provided; but, nevertheless, it is not the object of a good system to *store* waste matters in the sewers for any length of time. On the other hand, pipe sewers, intended to carry sewage *only*, are daily filled (at the time of the greatest consumption of water) to such an extent that the maximum velocity of flow is ensured, consequently deposits remain in these pipes for twenty-four hours only, provided the dimensions of pipes are well proportioned. In order to illustrate clearly this difference, the National Board of Health had a series of observations taken in various cities, on the dry weather flow of sewers of the combined system. I shall not repeat this bulky evidence, as professional readers will readily believe that the dry weather flow of even large urban districts covers the invert only a few centimetres deep, and could be carried by pipes of very small diameter when running full bore. But all the sewers experimented upon were *circular* in shape, in other words they did not have the most favorable cross section. If, on the other hand, we chose the *egg-shaped* section, its lowest part can be constructed the same or nearly the same as the lower half of a small pipe, consequently depth and velocity of the dry weather flow may be the same in either case. This has been done, for instance, with great success in the sewers of Mainz, Germany, where the lower portion of the egg-shape has a curvature of a *very small* radius.

Therefore, the claim of an advantage of separate sewers over combined sewers as regards velocity of flow is only true with regard to such combined sewers as are made circular on account of small size and for simplicity's sake. This is true ordinarily for sewers up to twenty inches diameter. Such a pipe is really less efficient in regard to removal of sediment, etc., than the pipe of the separate system, which would be only six or eight inches in diameter. But, even this difference ceases whenever artificial flushing arrangements are provided, for these do not permit deposits to remain in the pipes, and are used in every good system of sewerage, wherever the grades are flat.

The whole comparison is, in my opinion, therefore reduced to the fact mainly, that, supposing the same efficiency of flush for sewers of either system, separate sewers require *less amount of flushing water;* this fact may, occasionally, bear some significance, though often it is quite unimportant.

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* From a paper by R. Baumeister, Professor of Civil Engineering, in the Vierteljahrschrift für Offentliche Gesundheitspflege.

† The sanitary drainage of houses and towns, by Geo. E. Waring, Jr., 1878; p. 147.

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2. CHARACTER OF THE SOLID WASTE MATTERS OF SEWERS.

Only *organic* waste matters are carried into the pipes of the separate system—except, possibly, some sand used in kitchen sinks for scouring vessels. Such organic matter has a small weight and is therefore easily carried away by the velocity of the current. Sewers of the combined system, on the other hand, receive *mineral* substances from streets, yards, roofs, together with straw, leaves, horse-dung, etc. It is a matter of common experience that even with the most carefully constructed catch-basins, and even where streets are frequently and thoroughly cleaned and swept, it is only possible to keep *coarse* matters out of the sewers, while a large amount of *fine* dirt matter is carried into them at each rainfall. While it is true that this very rain affords an opportunity for removing deposits from sewers, nevertheless much dirt is left behind on the sewer invert, and has to await removal until the next flushing, natural or artificial, occurs. Such deposits occur especially with sand, owing to its greater specific gravity; unfortunately they, in turn, cause accumulations of organic matters, carried along with the sand or following it, which soon undergo decomposition. While, therefore, deposits from rainfalls are not *per se* important as regards the origin of sewer gases, they are, without doubt, indirectly their cause. Excremental matters carried in a few hours through sewers to the outlet are harmless, but, if mixed with mineral deposits, they are dangerous.

If, for instance, a stream of 3 cm. depth in a separate pipe sewer suffices to carry with it all solid matters—a combined sewer may require a depth of water of 10 cm. for the same purpose. For this reason Col. Waring attributes to the separate system the advantage of greater cleanliness, and certainly he is, generally, right. *How* great this advantage in each case will be must depend entirely upon local circumstances. Where streets have a heavy traffic, and are insufficiently cleaned, and where, furthermore, the grades of the sewers are light, where the regular flushing is not very efficient, and where rain showers seldom occur, there the difference is great; under opposite circumstances the difference is only slight, especially with regard to the quantity of *sand for scouring*, which is also carried into separate sewers.

But, besides the advantage indicated, a *disadvantage* revealed itself at Memphis, namely, obstructions through larger solid matters, which find their way into sewers through carelessness, or maliciousness; for instance, bones, chips of wood, household tools, etc. In larger sewers such matters would be easier removed in suspension than in the small pipes of the separate system.

3. ACCESSIBILITY.

In order to clean and repair the ill-constructed sewers built in old times, it was deemed necessary to make them large enough to admit a man, at least in a crawling position. This would require large cross sectional areas, and the cost of building such sewers is great; therefore, this idea was soon abandoned in sewer systems constructed later, except where the calculation would at any rate require a large sectional area; no blame attaches on this account to the separate system, whose sewers will never require to be of a size capable of admitting a man. But in modern combined sewers *man-holes* are always constructed at fixed intervals, and the line of the sewer between two consecutive manholes is made straight, where possible; besides man-holes, *lamp-holes* are constructed in order to inspect, and, if necessary, clean sewers by the "pill" or a scraper. The fact that such inspection openings were omitted on all branch sewers at Memphis, has called forth many adverse criticisms towards this system. This, however, has evidently nothing to do with the *principle* of the separate system. Col. Waring has answered this criticism by claiming that the interest on the sum necessary to construct man-holes and lamp-holes would amount to much more than the cost of an occasional digging up. This may well be doubted. I learn that pipes, which had to be broken into at Memphis, are now *replaced* by special *hand-hole pieces*, with a cover, which is easily removed.* While it is true that by doing so, finally all pipes at Memphis may be made accessible, after reopening all pipe trenches in streets, this seems to me to be a rather strange method of procedure. At any rate such digging would cause much too great an inconvenience *to traffic* in those cities where sewers are located under *paved streets*, and here man-holes for the removal of occasional stoppages cannot well be omitted. Their distance may possibly be greater in the separate system on account of absence of dirt, consequently their *cost* may be *less*.

An advantage of the method of sewer construction followed at Memphis lies in the fact that all house-connections were built in at once with the sewer, thus dispensing with any future digging of streets, to connect houses to the sewer. But, this advantage, too, does not belong to the separate system *as such*, and cannot well be quoted as *counterbalancing* the annoyance of digging up the trench in case of stoppages; for a house-connection occurs only *once* in a certain spot, while stoppages may repeatedly occur.

5.—VENTILATION.

In sewers, which receive both household wastes and stormwater, a great *variation* in the depth of water occurs. At times of rain-storms they fill up quite high, running often nearly full, the walls are wetted by the sewage, and the moisture penetrates them to a greater or less extent.

* Report to the State Board of Health of New York, by James Gardiner.

In time of drought a small current only runs through the sewer, but the damp walls above the water-line offer conditions favorable to the growth of bacteria, which together with organic waste matters remain clinging to the walls, and are, morever, exposed to foul gases derived from decomposing deposits on the sewer bottom. Artificial flushing will seldom suffice in quantity and force, *thoroughly* to remove and scour away such dangerous matters; they consequently remain in the sewer until the next heavy rain occurs, and after each rainfall the same process occurs again and again. Two favorable circumstances protect our dwellings against micro-organisms thus generated in sewers: *first*, the *dampness* of the walls, to which they adhere, for a drying and consequent dropping off is likely to occur only at long periods of dry weather. Should, however, bacteria drop off and be carried along in sewer air, *water-seal traps* render their entrance into our dwellings impossible, and since traps may be relied upon in a well devised system of house drainage, a comforting feeling of safety is secured.

The advocates of the separate system contend that it would nevertheless be better to prevent the *formation* of micro-organisms, and it must be conceded that the conditions in this respect are more favorable in the small pipe sewers of the separate system. These have no great changes of the water level; the maximum water level occurs once every twenty-four hours, and a flushing occurs during the same interval, filling and scouring the whole cross sectional area of the pipe, moreover the area of walls is small with pipe sewers; and all this certainly does not warrant the expectation of a large and rapid growth of bacteria, etc. But, to call *on this account* all combined sewers a sanitary failure, and to consider the separate system the only system admissible, seems to me to be exaggerated.

Only a relative, not an *absolute* difference, exists between both systems, and so far as the safety of the population is concerned, this difference does not amount to more than that which exists between a wild animal confined in a cage, or not existing at all in a country.

If we further consider the *removal of sewer gas*, which possibly contains harmful micro-organisms, preference must, on the contrary, be given to *large* sewers. For, if we imagine a small and a large pipe provided with like ventilating openings, the movement of air will encounter *more* friction in the small pipe than in the larger sewer, consequently, the air in it will move more slowly, and possibly not at all. Those creeks, which have been arched over in many cities, and are now used as sewers, and the cubic contents of which are very large, enjoy the best change of air. In the American pamphlets, of which I have copies, it has been said—and certainly it is proper to say so—that the Memphis sewers have been used for two years, and have been repeatedly examined and found to be free from sewer gas. Since they carry household waste matters they are said to have a disagreeable odor, but one not by any means as disgusting and vile as that of a common sewer. In other words, it is claimed that the ventilation of separate sewers is much more efficient than that of sewers hitherto usually constructed! This assertion I consider to be *wrong*, and such a claim reminds me of comparisons between incommensurable matters such as may, unfortunately, be found quite often in the literature on the disposal of town sewage. The above sentence, to be correct, should read as follows: A well ventilated small pipe is better than a poorly ventilated larger one; this nobody will doubt. Little care, indeed, often much to little, has been hitherto bestowed upon the proper ventilation of a system of sewers. The perfect arrangements adopted at Memphis, cannot, however, be attributed to the separate system as such, but may be equally well adapted for large sewers;* and as they may act even more efficiently with such, the above *objection* on account of bacteria is also entirely removed. With a construction and details worked out with equal care, large sewers cannot be considered essentially inferior to sewers of the separate system.

6.—REMOVAL OF STORM WATER.

Col. Waring attributes many sanitary disadvantages, to the hitherto usual method of removing the rain-water in deep subterranean channels, which at the same time receive sewage waters. He claims that the gullies, which should not only retain suspended earthy and organic matters, but should also keep back sewer gas, are not capable of performing this duty. At times of light rain storms, it is true, dust remains at the bottom of gullies, and clarified water runs off into the sewer; but water from heavy atmospheric storms arrives at the catch-basins so very turbid, and has so little time for settling of heavier matters in the gully, that most of the suspended matters enter the sewer, and give rise here to the evils spoken of heretofore. In gullies, too, the solid matters, which may settle at the bottom, accumulate, begin to decompose, send out vile emanations and annoy thereby the people passing on the sidewalk, moreover, the water in the catch basin, may entirely evaporate during periods of draughts, the waterseal is lost, and sewer gas is allowed to escape.

There can be no doubt about the existence of the evils just mentioned. But such objections should be raised not against the system of sewerage, but against the deficient cleaning of streets and gullies, or, if one choose, against the considerable amount of labor required to keep the whole in order. It is the system of street cleaning in American cities, which is far from satisfactory, as Col. Waring himself admits. It would be considered an extraordinary negligence, according to our ideas, if dirt would be allowed to accumulate in a gully so much that its decomposition could not be checked by a covering of water.

* As for instance, in the Sewerage Project for Königsberg, Prussia.

Let us now inquire, how rain-water is removed in the separate system. As the temporary presence of rain-water on the surface may be considered unobjectionable from a sanitary point of view, it is recommended to construct *open gutters* of large cross sectional dimensions and for such distances as may seem admissible with regard to street traffic; eventually the gutters may be covered, but should be left accessible for cleaning purposes. This, of course, gets finally impossible with increased traffic, in main thoroughfares, which have already received the water from several side streets, and sometimes with regard to adjoining property, it becomes necessary to lay the channels for rain *underground*. But their *depth* below the surface will not be greater than the grade and the precaution against frost demand; generally it may be *less* than the depth of sewage pipes and subsoil drains. Otherwise, the constructive details will remain similar to those of our combined sewers, since we could not and would not wish to dispense with requirements such as proper cross section, impermeability, smoothness, strength to resist the pressure from the street traffic, accessibility, by means of manholes, waterseal traps in the catch basins, etc.

The system described presents, in fact, technically nothing else than the rudiments of *any* system of town drainage; one tries to get along with open gutters as long as possible, and is finally forced by considerations regarding the traffic to construct *underground* conduits. But in a sanitary and æsthetic point of view, there is this difference that in the new system we have to do only with comparatively pure storm water, while it was customary (and I regret to say that it is so even now) to carry household wastes to the gutters, which would create nasty deposits and exhalations.

If we now make a *comparison* between the combined sewerage and the separate removal of storm water in open gutters (as long as such are feasible), it is evident that the latter method has the advantage that the storm water is more efficiently used in flushing gutters, and on the other hand the disadvantage that the convenience of the traffic suffers.

Col. Waring regards the latter as unimportant, as the break of the street surface by large gutters is more disagreeable than dangerous, and because an occasional overflowing of the street by a heavy shower is more endurable than bad emanations from catch basins. It is true that in our (European) sewerage systems extravagance sometimes prevails, and that small towns and distant and out-of-the way streets are at once provided with underground sewers, while they could have removed storm water for a long time on the surface, but underground sewers are required on account of the sewage, and so it became customary to take the rain into the same channels.

On the other hand, it appears to me that the labor required to clean streets cannot be reduced by the separate system. For, under any and all circumstances, it is desirable to allow as little as possible of the dirt from the street to get into underground sewers, because to lift and remove it out of sewers costs more than to cart it away before it gets into the sewer. It would seem to me to make little essential difference, whether a certain volume of dirt was removed from the surface of the street, from gullies. or from gutters.

7.—COST.

It is a well-known fact that the large cost of a sewerage system, intended to carry off both rain water and sewage, often discourages communities from taking measures for a systematic method of sewerage and drainage. It is immaterial for the above whether human excreta will be removed by water carriage, or by one of the dry-methods of removal, as the cost of sewers is independent of it. In small towns in particular, in scattered built-up blocks or suburbs, and in proposed streets, the construction of large sewers is difficult, since it puts a heavy burden upon the community, or else requires large contributions from, or assessments upon property owners.

It cannot, in my opinion, be *generally* decided whether or not the separate system reduces the cost of construction; this can be done only after consideration of the conditions of each *special* case. Nevertheless, it is possible to group such cases, and to make, based upon this, a few general estimates, such as the following:

(*a*) Where a town extends along a natural watercourse, and has wide cross-streets running to the water with a good grade, storm water may entirely run off in surface gutters. These may possibly require to be covered up at street crossings, or at certain other points. The underground work is, in such a case, reduced to a system of separate sewers for sewage only, to which is eventually added a system of subsoil drains. In such a case the cost of the system is much *smaller* than that of a combined system, and some American assertions may be true, that the former is only *one-fifth* of the latter. Such conditions prevail not only at Memphis, but in other American cities, which have been located along the banks of a river. In older cities of a like character, for instance, at Lubeck (Germany) the width of streets is insufficient; but there are numerous small towns the sanitary condition of which might be largely improved at a moderate cost by such a system.

(*b*) Where towns or cities are situated similar as described above, but where the storm water must be carried off *below the surface*, either out of consideration for the traffic, or on account of insufficient grade of streets, the separate system may still offer financial advantages. For channels for rain water may be run by the *shortest way* to the river, hence they require but small sizes, and moderate depth below the

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surface, while a combined system would ordinarily require the construction of large and deep *intercepting sewers* parallel to the river, in order to avoid the location of the outlet within the city, or sometimes to avoid it entirely. Moreover, many cities have creeks, which are left open or else arched over, and are unobjectionable from a sanitary point of view as rainwater channels, and may be economically utilized for such a purpose, while, as is well-known, these same arched brooks, converted into channels for *rain and sewage* have, in many cities, become great nuisances and had, consequently, to be abandoned. Therefore, the separate system may be recommended for many cities which can get rid of the rain-water by means of open or covered gutters, short underground conduits and natural watercourses, although the opinion of an American Engineer, that it would cost *one-half* of a combined system, appears to be worthless on account of its generality. Even in a place which has been only partly or unsatisfactorily sewered the question seems proper, whether or not the existing sewers may be used for rainwater only in future, while a new system of separate sewers should be built for sewage.

(*c*) Let us further consider a city which *lacks facilities for surface drainage;* under such circumstances the adoption of the separate system necessitates the construction of one system of sewers for sewage, of another for storm-water, and possibly of a third system for subsoil drainage, and this some opponents of the separate system have rashly considered to be the *bête noir* (Schreckbild) existing *in all cases.* The total cost will, in such case, *exceed* that of a combined system, but *not very largely,* since rainwater conduits may be laid close to the street surface, and because both systems may be constructed simultaneously. It is impossible to estimate, in a general way, the difference of cost; the American supposition of 25 per cent. appears to be rather a rough guess. But it should be remembered, that in many cases the costly construction of such a system *inside* of a city may be largely counterbalanced by saving in cost *outside* of it; and this is especially true where the contents of deep sewers must be raised by *pumping,* and where *sewage must be purified* by irrigation or otherwise. How much may dimensions of pumps, outlet sewer, clarifying basins, irrigation areas be reduced, if *sewage* only has to be handled; how economical and regular may the operation and management of pumps and irrigation fields be organized, where no unusually large quantities of sewage have to be taken care of, which are of no agricultural value for purposes of irrigation.

(*d*) I finally mention the possibility of *combining in one city both sewerage systems,* not only by treating different sections of a town *independently* of each other, the one by the combined, the other by the separate method, but also in such a way that the two systems may be actually *connected.* This may be done as far as the *locality* is concerned, side by side, or as regards *time,* successively. In the first-mentioned instance, certain streets or districts are provided with combined sewers, which also receive the separate sewers of other streets or districts; the storm-water of the latter may, under circumstances, run in the same direction, but should be, if possible, carried off independently. Naturally, the combined system would be adopted, principally for low-lying, densely populated districts, which possibly have already been provided with sewers, and also for the principal streets and thoroughfares, while the separate system is more suitable for high-lying, more widely built, out-lying districts, and also for by-streets. In what way and to what extent the two systems may touch or penetrate each other will depend entirely upon local circumstances, and should be decided in each case by comparative estimates of cost (for instance: Danzig and Königsberg).

Then, again, the two systems may follow each other as regards *time:* first, a separate system of sewers for sewage might be constructed with surface removal of storm-water, and it might be contemplated to substitute instead of it, with increased traffic and more densely built-up blocks, combined sewers. The object in doing so would be this, that by adopting first the cheaper system, sufficient interest on the working capital may be saved until the time of change to cover the cost of the first system, or even to save a surplus. Whether or not this would be the case, should, of course, be determined by careful comparative estimates of cost, and by estimates of the growth of the city. Generally, such a course should be well considered, especially in suburbs, or districts expected to grow, in order not to increase too much the assessments upon property-owners, and in order to favor the construction of the system by intervals, according to needs.

CONCLUSIONS.

To sum up the above considerations, we find the separate system to be a highly important departure of sewering cities, which is capable of the most varied application for new projects, as well as for towns already partly sewered, and for newly laid out suburbs. Some good details of design and construction, such as are found in the separate systems actually built in the United States of America, may be equally well applied to combined sewer systems, and may be partly seen in actual use in the best systems constructed in Europe.

The *fundamental idea* of the separate system, *i. e.*, separation of sewage from the rain-fall, offers not only hygienic, but in many cases, financial advantages as well, but causes certain inconveniences to the street traffic. The latter may, under certain circumstances, prohibit its adoption from the beginning.

Otherwise, the *sanitary advantages* as compared with the combined system, are *not,* in my judgment, so great that they should decide the question. The latter is much rather of a *financial character,* and one in which both cost of construction, and cost of maintenance and operating expenses should be jointly considered.

Wherever the separate system would *cost more* on account of local conditions, a combined system will be adopted; wherever it costs *less,* one ought to be happy to be able to effect the underground removal of all liquid household wastes, even under limited financial conditions.

September, 1882.

AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.*

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

(Continued from page 485.)

Similar scales, but much more elaborate, furnish the dimensions for the valves and other details in the construction of steam-heating apparatus. The leading example already given will suffice however as an illustration of the method.

It might seem that too much prominence has here been given to minor details, in dwelling at such length upon the screw-threads and the exact proportions of tubes and fittings; but it can be unhesitatingly asserted that facility of construction, economy of material, and careful elaboration of detail, have been largely concerned in the establishment in America of an industry almost unknown in Great Britian, and of which the history has hitherto remained almost wholly unrecorded. Indeed the only book in the English language on heating by steam, until the publication in America of an elementary work a few months ago, was that of Robertson Buchanan, 1811-1814. Beyond the catalogues and circulars of manufacturers and dealers, little or no practical information has appeared in print; while a whole class of skilled workman, and nearly forty years of experience, have developed the practicability of the system, and extensive usage has accustomed the entire American community to its attendant discomforts and annoyances.

Boilers.—Most frequently, and in particular for large apparatus, the steam for warming in America is supplied by one or more horizontal tubular or Seguin† boilers, set in brickwork. For a small extent of warming apparatus the vertical tubular boiler with internal firebox is possibly the one most usual. For medium, and large apparatus the original Seguin boiler is adopted, which consists of a horizontal cylindrical shell, containing tubes in the lower half, with a steam dome on the top; the tubes are arranged in vertical, and horizontal rows, not alternating or zigzag; and the best practice is to place a manhole in the front end over the firedoor, and beneath the tubes. The boiler is fired underneath, and the products of combustion return through the tubes from the back to the front, and then pass back again over the top to the boiler, which is covered in with brickwork; the temperature of this top flue rarely exceeds 400° Fahrenheit. The fuel used is anthracite coal, yielding 8 to 12 per cent. of ash; and when well supplied with air it evaporates from 8½ to 9 lbs. of water per lb. of coal. The boiler fittings, gauges, valves, pipes, etc., are such as are usual for boilers in England; only, as they are rarely made by engine-builders, but by the "steam-fitting" maker, it can be claimed for them that they are generally more sightly, as well as better and less expensive, than in England. Dampers and damper-regulators are in general use, the latter being constructed with elastic diaphragms arranged to be loaded for any desired temperature, and often with some automatic arrangement for changing the load to meet changes of temperature outside or inside the building warmed. Where the whole of the circulation through the warming apparatus is entirely closed from communication with the atmosphere, the boiler pressure is allowed to fall below atmospheric pressure, to be as low as 140° temperature of the steam.

One other boiler at least has successfully stood the severe test of competion with the Seguin boiler, namely that known as the Babcock and Willcox water tube circulating boiler,‡ having a horizontal steam-drum or separator overhead. This boiler was tried by Mr. Nason in nearly its present form, but with smaller tubes, the joints of which failed as made by him.

Either of these boilers is practically safe from disastrous explosion. Out of the many thousand of Seguin boilers which have now been in use from one year to forty years, only two or three well-authenticated instances have occurred of violent explosion, and none so far as the author is aware, have involved loss of life. Of all the stationary boilers that are employed in the United States for any purpose whatsoever, perhaps one-half are of the Seguin type. The deterioration of all heating-apparatus boilers is more serious from rusting in summer when idle than from wear in use. In fair service the duration of the shell of the horizontal tubular boiler is from thirty to forty years, at least where water is employed that does not produce scale or deposit. The wrought-iron flue tubes cannot be considered to last more than seven or eight years, even with water of good quality.

The most serious defect in the Seguin boiler is the liability of the bottom plate, just over the fire-bridge, "to come down" or bulge outwards, or to become blistered, when strong firing is carried to the extent of 10 lbs. of coal or upwards per square foot of grate per hour. This accident is more likely to happen when the tubes are arranged zigzag in alternate rows, or are placed close together, the circulation of the water between them being impeded in either case; and the provision of a large water space in the bottom of the boiler, such as results from the practice already mentioned of placing a manhole in the front end beneath the tubes, tends to obviate the risk. Recently a hollow framing or slab, made of boiler-plate, filled with water and connected with the boiler by circulating pipes, has been substituted for the front plate of the furnace containing the fire-door, and thus forms a permanent wall, serving also as a saddle to support the front end of the boiler. The details of brickwork setting, flues, and chimney, present no unusual features as carried out in America.

There are of course innumerable varieties of boilers and settings. The possible contortions of boiler-plates, tubes and castings are far from being exhausted; and the economy claimed for each fresh device is generally in proportion to its complication. Just now there is a crop of devices in America for the more complete combustion of gases, after the plans generally of the late Mr. Charles Wye Williams, Assoc. Inst. C. E.; some of these, and others for burning such fuel as saw-dust, coal-dust, spent tan, etc., are as successful as they were thirty years ago.

For the fire-grates also of the boilers there is a revival of sundry shaking appliances; but for the American anthracite these schemes will speedily die out, since it resents the least disturbance after having once been ignited, and admits only the gentlest turning at the bottom for allowing the ash to run out like sand from an hour-glass. An improved grate however, made with wrought-iron fire-bars of square or triangular section, with their ends resting in bearings so that each bar separately can be rotated, seems really to have won favor for heavy firing, and must be mentioned with approval.

For the smaller sizes of warming apparatus there are several devices of magazines for holding a store of fuel, from which a continuous supply to the firegrate is dragged down or allowed to run down upon the grate. Some of these magazines hold 4 to 8 tons of coal, which will last from one month to three months. It may be mentioned that American anthracite coal, having the strength of most English building stone, is got from the seam in massive blocks; these on reaching the pit bank are broken up into lumps, which for domestic use are screened to various sizes, ranging from as small as peas to as large as eggs, while the "furnace coal" for manufacturing purposes is sorted in still larger sizes.

TO BE CONTINUED.

* A paper read before the Institution of Civil Engineers, November 28, 1882.

† Introduced in France about 1826 to 1830 by M. Seguin, engineer of the St. Etienne and Lyons Railway; and in America about 1844 by Mr. Nason.

‡ Minutes of proceedings Inst. C. E., vol. lxi., p. 379

Will "Young Reader," who writes to us about fitting up boilers and tanks, please send us his name and address? This is the necessary condition of obtaining an answer.

A bill is under consideration in the Connecticut Legislature, appointing Professor William Brewer, of the Sheffield Scientific School, Commissioner to report on the pollution of streams.

The *Builder* mentions a case of lead poisoning in which the party brought suit against the corporation supplying the water. The water was brought through a lead service-pipe, which, it appears, was the property of the plaintiff, and put in at his expense. The court decided that as the water was wholesome as supplied by the corporation, and that as the consumer had a choice of material for service-pipe, the corporation was not liable for injuries sustained.

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Correspondence.

THE SEWERAGE OF BINGHAMTON.

A REPLY TO MR. HERING.

NEWPORT, R. I., *April* 28, 1883.

To the Citizens Committee, Binghamton, N. Y.

Gentlemen:—With no desire to enter into a controversy with Mr. Rudolph Hering, I shall make a very brief reply to his strictures on my former communication.

Mr. Hering is annoyed by my statement that his project is "very crude, imperfect and unsatisfactory," and he retaliates by suggesting neglect of duty in my own study of the case, and crudity in my work. Mr. Hering has read my criticism with too sensitive an eye; my remark applied entirely to the *system* he had adopted, not at all to the *project* that he based upon it. I never supposed that he was not thorough and conscientious in the performance of his task. With his assumption that I slighted my work, I, of course, do not agree, nor do I consider the charge worth refuting; my methods are tolerably well known, and my results are generally respectable. In a spirit of less annoyance Mr. Hering would probably not have questioned them as he has.

Concerning the differences between us Mr. Hering brings to his support eminent and well known authorities. The engineers to whom he refers would not pretend, as he evidently does, that the systems according to which they have been working are not susceptible of improvement. As a matter of fact, the best of them, including Mr. Rawlinson and Mr. Lindley, have voluntarily expressed to me their most cordial appreciation of my improvements.

It will suffice to say here, that I still consider the system recommended by Mr. Hering "very crude, imperfect and unsatisfactory,"—in fact, in view of what we now know, little better than a makeshift. I reassert in the most emphatic manner all of the statements of my former communication to you. If you need further argument in the matter, I am confident that I can convince you that I am generally right and that he is wrong—*in system.*

Mr. Hering, in questioning my right to a patent, as he seems to do, evinces a less favorable opinion of my common sense than I supposed he entertained. I have long been familiar with all the facts that he cites concerning previous work. My solicitors were made familiar with the same and the examiner at the patent office made a searching investigation as to the state of the art at the time of my application. It was found, on all hands, that the *combinations* that I patented were entirely novel.

The engineer who constructed the sewerage of Pullman paid me the very sincere compliment of imitation. His work was practically a repetition of that at Memphis, and was fully covered by my application, already on file in Washington.

Mr. Hering's quotations from THE SANITARY ENGINEER, so far as they apply in principle, seem to have an equal bearing on the patented "system" for house drainage with the aid of wrought iron soil pipes, with which he has hazarded a professional alliance.

GEO. E. WARING, Jr.

HEATING PRIVATE RESIDENCES.

NEW YORK, *April* 10, 1883.

To the Editor of THE SANITARY ENGINEER:

A correspondent in Ohio writes me as follows: "I intend building a residence this spring, and would like some advice about the best and most healthful means of *warming* it. What would you advise? Have you had any experience with steam or hot water?"

Can you, through your good paper, give some information on this subject?

Thanking you in advance, I beg to remain,

Truly yours, EDWARD WINSLOW.

[As a general rule we dislike queries to answer on which it is necessary to write a small treatise. In this case, however, we take up the subject of the best and most healthful methods of warming houses in the State of Ohio with much pleasure. The great majority of houses in that fertile and favored region are best warmed by stoves, for the reason that the people living in said houses cannot afford to purchase indirect radiation apparatus or to provide the fuel for it if the apparatus were given to them.

We infer that the Ohio correspondent is able to provide either steam or hot water apparatus, and that, therefore, his house will be a large and somewhat costly one.

(In parenthesis we may remark that the amount of recreation and direct happiness obtainable from studying a question given in terms as above, considering all the possibilities of the case and guessing at what is wanted, can only be understood by actual experience.)

We have used both steam and hot water, and of the two, for a private residence in Ohio, we think it most probable that we would prefer the hot water. With either of them there can be arranged a thoroughly good and healthful system of heating, but this best arrangement is somewhat expensive; and moreover, to secure the best results, it requires that the gentleman who is going to build the house shall place the sketch plans of his architect, before the working drawings are commenced, in the hands of an expert to advise as to the heating and ventilation.

If this expert is not connected with any furnace, steam or hot water heating establishment, he will probably charge from $50 to $150 for going over the plans—calculating what is needed and furnishing the requisite data to the architect.

But there are difficulties in finding the expert, and in insuring, that his advice is carried out. This plan requires not only good judgment, but a very firm determination, to make it a success.

Now, while in this country almost every one who can do pipe fitting is ready to undertake a steam heating job, the case is different as regards hot water, and the probabilities are that the few who will bid on a hot water job will understand their business much better than those who will furnish the lowest bids for a steam heating plant.

The principal objection to a low pressure hot water apparatus for a private house is the amount of space required in the basement or cellar for the coils with their containing piers. The essential feature of this form of apparatus is that it gives a large heating surface at a comparatively low temperature (below 200° F.), and to give this surface requires room.

Nevertheless, it is possible, by the use of mixing chambers, to obtain the same results with steam or with furnaces as with hot water, but more care and attention will be necessary to secure constantly satisfactory results.

If cost is a consideration, we would use a hot air furnace and have open fireplaces besides. If willing to incur a greater expense than the above would involve, we would use steam heat and the fire-places, and if room and expense were no consideration, we would use a hot water apparatus and the fire-places.

On page 331, issue of August 1, 1880, will be found an instructive chapter on this subject.]

A SUGGESTION FOR NEW YORKERS.

NEW YORK, *April* 25, 1883.

To the Editor of THE SANITARY ENGINEER:

While on the subject of an increased supply of pure water for this city, would it not be well to try and keep what little we have as free from contamination as possible, instead of, as is now the case, bringing it directly in contact with the foulest air to be found in our houses before using it in our kitchen or upon our tables? Permit us to explain what we mean. It is usual to place an open tank or reservoir for water in each water-closet, which tank is supplied directly from the Croton pipes, through a faucet, which is controlled by a float or metallic ball connected to the faucet by a lever. As the water in the tank lowers, this ball falls with it, and thereby opens the faucet and admits a fresh supply if there be any there to run; but if, as is now the case in most parts of the city, the water does not rise to the tank except during the night, the ball continues to fall as the water is drawn out of the tank, and for the greater part of the day the faucet is wide open, and whenever water is drawn in the kitchen or lower parts of the house the water-pipe is filled with air from the water-closet. We know of several that are in this condition, and they may be heard at any time almost during the day, as the air is drawn into the pipe with a whistling sound when water is being drawn down stairs, or when again it is shut off, and the water suddenly rises in the pipe and expels the air.

Why are not these tanks made air-tight, and supplied with fresh air from above the roof? Would not the following plan be practicable and remedy the evil?

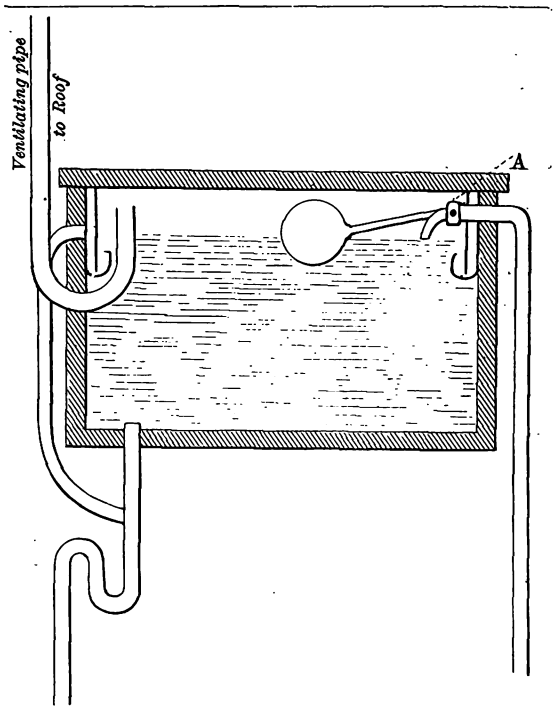
For the ordinary tank now in use, make a cover, and line the under side of it with sheet lead or other metal and let this metal lining turn down so that the lower edge of it will drop into a groove, which extends all around the sides of the tank, and just below the line of over-flow, so that this groove will be filled at least once a day; now, when the water is out of the tank this groove contains water enough to make a seal and keep all air from the closet; now run a pipe from the tank to the roof, and supply the tank through this pipe with pure air, as shown in diagram.

To leave the cover free to be lifted off we would run the pipe, as shown through the side of box, and turn the inside end up above the water line.

Yours very truly, etc.,

EDWIN A. JACKSON & BRO.

[We presume when our correspondents refer to a water-closet cistern they mean the cistern sometimes placed over it, from which the flushing water is drawn. They are mistaken in supposing that most water-closets in this city are so flushed; by far the greater part are flushed through a valve or ball-cock attached to and being part of the closet itself, and the risk he alludes to in the case of the cistern, while to some extent it exists, yet is by no means as great as with the direct supply, and such as it is depends on the character of the air in the room in which the cistern is placed, and the condition of the cistern as to cleanliness. The absence of an adequate water supply in this city undoubtedly entails many risks, and that pointed out is one of them; but the remedy proposed by our correspondent in this particular emergency does not strike us as practicable. The only safe and proper plan is to insure that at all times there is a supply of water for these cisterns, so that the ball-cocks cannot remain open, and not to rely on water-closet cisterns as storage tanks to be filled through a ball-cock at night. For the next six



years at least no cistern or water-closet in most houses in this city above the first floor can rely on having a constant supply of water, unless a tank is placed at the top of the house, which tank must be kept full by pumping; and water from this tank must be conveyed to the fixtures below it. Unless something is done to stop the waste, we expect that even the first floors of many of our houses will be deprived of water from street pressure before a new supply reaches the city. We advise householders, therefore, to place tanks above where they want to draw the water, have these tanks kept full by pumping, and take a supply from that to the various fixtures that they wish to retain in use; others should be removed. Drinking water should be drawn from a trap down stairs, and not from this tank.]

To the Editor of THE SANITARY ENGINEER:

Can you inform me in what way I can procure Douglas Galton's device for heating an ascending current of air in an open fire-place, mentioned in Dr. Coan's "Ounces of Prevention," in *Harper's Weekly* of March 24? I have a couple of fire-places that I would like to use if I can prevent too great an outlay for fuel. F. F. C.

[The Galton fire-places are referred to in a paper on Small-pox Hospitals, by D. R. J. Farquharson, Secretary of the State Board of Health, Des Moines, Iowa, full extracts of which were given in THE SANITARY ENGINEER of May 11, 1882. Dr. Farquharson there said: "Finding (in 1876) no Galton fire-places were to be had in this country, I procured two made in Cincinnati, which answered the purpose very well." You can probably obtain from him the address of the Cincinnati makers.]

JOURNEYMEN PLUMBERS' PICNIC.

The Benevolent and Protective, and the Brotherhood and Journeymen Plumbers will unite in holding a picnic, with athletic games, at Sulzer's Harlem River Park 126th street and 2nd avenue, June 5. Three series of events are provided, one open to members of the societies, one to the plumbing trade and plumbing material manufacturers, and one to all amateurs. These events include 100 yards dashes, quarter mile run, half mile run, one and two mile walks, tugs of war, throwing the hammer, running broad jump, and sack race. The combination of the societies in the one grand picnic ought to make this unusually successful. Persons who may wish to donate prizes should communicate with George W. Flood, 225 East 74th street.

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PLUMBERS' PROFITS.

FREEPORT, *April* 21, 1883.

To the Editor of THE SANITARY ENGINEER:

Have been a subscriber for your valuable work only a few months, and in those few months have found how *bitter* "plumbers' profits" must be to those who call themselves "practical plumbers." And I must say with "Helper," of Chicago, *What* are they?

I am the only practical plumber here, but have a hardware firm with tinners to compete with, and such is the desire to have cheap work done, that a plumber can get no profit, not even the regular pay.

They buy their goods from the same firm that I do, and this firm sells to every plumber in Chicago. I will give the name of the firm if need be. I know this, for I belong in Chicago myself. Now I say, let the plumbers, all of them in the United States, form an association, and notify the dealers to protect us, or we will protect ourselves, and any dealer found selling goods outside the trade to quit trading with him.

I wish to make reply to Mr. Worthington of Philadelphia: "Can you be honest and furnish compression finished bibbs at 75 cents apiece, or ¾ strong lead at 12½ cents per foot?" That is the competition I have, and shows what hardware men can buy material for.

In reply to your editorial, in April 5th number, the leading Chicago firms sell at list price to builders; I can prove it. Then they say the plumbers don't protect themselves. It is false. If the plumbers take a job for less than cost, it is to beat some one whom they have sold goods to.

How can we compete against tinners any other way? Why do plumbers fail? Simply because every hardware firm in the United States is dealing in plumbing material, and buying cheaper than the plumbers themselves. Why, one of them offered me porcelain goods cheaper than any one can buy them in Chicago. That shows how Chicago gets left.

In reply to Mr. Moody, of Worcester, he should congratulate himself for not receiving some of this experience. Refer him to some of the prices in my letter, and see how much profit he would get.

I am glad the plumbers are to have a convention for this purpose. They can never make a living in the plumbing business, until they put a veto on the manufacturers. I think Mr. Bargamin, of Staunton, Virginia, gives a true statement, in this matter; also Mr. Young, of Chicago. These curbstone plumbers that Bargamin is troubled with ought to be run out of town.

Please agitate this question, Mr. Editor, and you will receive the many thanks of plumbers.

[We should be glad to see all good plumbing succeed in business, but that is hardly in accordance with the natural order of things. We must say, however, that we think Mr. Moody has a better appreciation of the problem, and the conditions necesary to its solution, than our Freeport correspondent.]

To the Editor of THE SANITARY ENGINEER:

Please let me know, through your valuable columns, where there is a hydraulic jack made in England, that a man can fill with two gallons of water every six weeks, and use it about fifty times with the same water, or if he will have to renew the water every time the jack is in use, and oblige, Yours respectfully, JOHN NORRIS.

[Hydraulic jacks, or lifts, which use the same liquid repeatedly, though not so large a quantity as two gallons, even in the larger size, are manufactured by R. Dudgeon, 24 Columbia street, New York, and 114 Fenchurch street, London, and, we presume, by numerous other English firms.]

NEW YORK, *April* 13, 1883.

To the Editor of THE SANITARY ENGINEER:

Do you know of a pipe made with a valve like a clack valve, to be used in drainage? I have a foundation made on a trench of broken stone and drained by a 4-inch pipe to a sewer. Had hoped to strike the sewer on *the top*, but could not. In most circumstances, indeed, all except extraordinary ones, this will work, but sometimes (it has happened once in six years), the water backed up in the sewer and went into the foundations and cellar of adjacent houses; so to prevent it I want a pipe with a valve opening but one way.

Please give me what information you can, and oblige, Yours respectfully, WM. H. WILEY.

[Several horizontal flap valves have been made to place in a line of pipe. With these, however, there is a possibility of stoppages. An ordinary brass sewer valve on the end of your drain pipe, which hangs open, except when back flow of water closes it, is used for such purposes. Either of these appliances your plumber will know where to get, as dealers in plumbers' materials sell them.]

LAYING DRAINS.

WILMINGTON, DEL., *April* 20, 1883.

To the Editor of THE SANITARY ENGINEER:

As a compromise between your suggestion of a walled and covered trench (page 459 S.E.), and that of Col. Waring's, of filling the pipe-trench with grout, I would suggest, in order to avoid a possible harbor for rats, etc., to fill the walled and covered trench with clean sand or gravel around the pipe, which could easily be removed when repairs were necessary. C. E. F.

[The suggestion of C. E. F. is open to this objection, viz: That when pipes are buried in sand they are not readily made *visible*, and if a leak occurred it would continue indefinitely, till the bed of sand and all its surroundings became foul. If under or inside of a house, such a state of things would be likely to be dangerous to the health of the inmates long before it might attract attention.]

SEWAGE DISPOSAL.

The Local Board of Hendon, England, are exercised about purification of the sewage from that town. At a recent meeting, Mr. Melliss, the well-known engineer, appeared by request before them, and gave informally, in reply to questions, some interesting information. A full report is given in the *Hendon and Finchley Times*, from which we condense the following synopsis of his remarks.

Mr. Melliss said, in substance:

"I have had a great deal of experience in connection with this matter of sewage treatment. In fact, for 25 years I have studied the matter, and for the last ten years I have been almost exclusively connected with the matter. I know all the systems in vogue, and I have carried out a great many experiments myself with a view to arriving at the truth.

"I recommend the system used by the Rivers Purification Company because I consider it to be the best; not on the evidence of my own experience, but founded on the published evidence of independent men. The Local Government Board some time ago appointed an inspector, Dr. R. Smith, to look into precepitation processes with a view to such a process being allowed to be adopted by local authorities. Mr. Smith made a very careful and scientific investigation of the processes, and his report was published in the form of a blue book. That is the only official document bearing upon precipitation processes, unless we take one which was published by the town council of Glasgow some time ago. Dr. Wallis analyzed the effluent water and made a very valuable report for the use of the town council. These are the only two documents I have seen which are really outside the pale of interested companies or parties. As these state that the Rivers Purification Company turn out the best effluent water, I recommend that system.

"They are not bound to any particular process, but the precipitate they use is an alumina process. I draw a distinction between the processes in use which have lime for their base and others which have alumina for their base. In an alumina processs, salts of iron and a very small quantity of lime is used. They filter the effluent through land, or, as at Hertford, where it is filtered through artificial filters.

"If the operation of treating sewage by precipitation is properly done, there is not the slightest cause for complaint; but if the work is improperly done, there will be an intolerable nuisance.

"Properly designed precipitation works can be executed so as to be suitable for any process without subsequent alteration.

"Assuming there is no pumping, and if the sewage could be gravitated to the outfall, I should think works could be created to deal with 10,000 persons for between £3,000 and £4,000. I am, however, speaking quite off-hand. That would include three or four tanks.

"How much land would be required for that sewage to run over would depend much upon the quality of the land. It also depends upon the depth to which it can be underdrained. I should not hesitate, if the land is at all reasonable, to put the sewage of 2,000 persons on each acre. If the land is very good we might get more upon it.

"The cost at the outfall would materially depend on the amount of sewage which came down. In a town of 10,000 inhabitants, if only 2,000 were connected with the sewers, the cost of treatment would be less.

"If I understand rightly, nothing has yet been done at Hendon, so that it is quite clear the field before you is much better for that, but the time has come when the public look at the drainage of a district, and when they find a place which is not drained they will not live in it. Last week I was called to a house in the Thames Valley. It was a very fine mansion, but it had no drainage at all, and I was asked by the occupier if he should leave the house. Coming to the question as to how you should act, I should say get out a scheme or system of drainage. Carry out the main principle—lay down your sewers and provide outfall works. After that is done, then I should advise you to make a bargain with some one to provide for the sewage at the outfall; but you must take care how the bargain is made. I always advise sanitary authorities to do this.

"I certainly advise you to separate the sewage as much as you possibly can. In some places which I have examined and reported upon, it was almost certain that a portion of the rainfall ought to go into the sewers for flushing and cleansing purposes. In a new scheme the rainfall is excluded.

"As regards the value of the sludge or manure produced by precipitation, unfortified by any addition thereto, to enhance its commercial value; Dr. A. Smith's report, and also that by Dr. Wallis, the chemist to the Town Council of Glasgow, state that sludge treated with lime was worth about 10*s*. a ton, and sludge treated with alumina worth about 20*s*. per ton. I doubt very much whether any sludge made into cake is worth £3 10*s*. a ton. During the past 25 years the manufacture of manure from water-carried sewage has ruined several big companies, and money to the extent of £100,000 has been spent. If the Board can get a company to give a substantial guarantee to treat the sewage in that way and sell the manure at £3 10*s*. per ton I should say, by all means take it, but have the guarantee very well drawn out."

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
April 28.....	27.78	20.15	23.11	29 55	30 32	19.78

E. G. LOVE, Ph.D., *Gas Examiner.*

STEPS TOWARD PUTTING ELECTRIC WIRES UNDERGROUND.

As briefly noted in our issue of last week, a conference of representatives of nearly all the electrical companies of this city—telegraph, telephone, electric light and fire and burglar alarm—was held at the office of the Gramme Electrical Company, in the Boreel Building, 115 Broadway, on the 20th ult., to consider the expediency of united action on the question of underground wires. The meeting had been called by Col. R. R. Hazard, President of the Gramme Co., who, in his opening remarks, said:

"We have all seen the ignorant, ill-considered and ill-digested legislation in relation to this subject, arising undoubtedly from the absolute lack of knowledge of legislators as to the real nature of the questions involved. And it has occurred to me, that by bringing together gentlemen representing the different corporations most interested, we might be able to understand the subject ourselves thoroughly, and show to the legislators and the public that our interests and their interests are substantially identical, and that we are on the road to giving them all they want. That is the object of the meeting, and to that end the twenty-one electrical corporations doing business in the city of New York were invited, together with the scientific men and the professors of the various universities, the Governor of the State and the Mayor of the city, so that everybody might be here if they saw fit, and represent the views of their constituents."

After the election of Mr. J. P. Davis, Vice-President of the Metropolitan Telegraph and Telephone Co., as chairman, Col. Hazard offered a series of resolutions, with a view of bringing up a discussion. "The purpose and extent of the resolutions," said Col. Hazard, "is to leave the whole matter to a select and authoritative committee representing all the different interests." Each company was to have one representative. Mr. Pope, of the Manhattan District Telegraph Co., said he thought it hardly necessary to appoint one for every company. He thought so large a number would not work together to advantage, and that five or six, say one for each class, would be better. Col. Hazard, in reply, said that this had been considered, and it was thought that if all were not represented there would be a certain amount of jealousy and mistrust. It was, moreover, proposed to sub-divide the committee when appointed, having one committee on electrical and scientific questions, one on mechanical problems, another on legal points, and another on the business and commercial side—care being taken to select the highest talent in each department.

Mr. Chandler, of the Fuller Electrical Co., agreed with Mr. Pope that the number of the proposed committee was

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too large, but the prevailing sentiment of the meeting was in favor of the original number proposed, and in favor of the resolutions in general. Prof. Morton said they seemed to meet the case. "It is taking hold of the thing in a rational way, and something or other is likely to come out of such a handling of it."

After some further discussion, resulting in a few slight amendments to the resolutions, they were unanimously adopted in the following form:

"*Resolved*, That in the opinion of this meeting the time has arrived when it is expedient to make exhaustive examination of all devices and inventions pertaining to the subject of underground electrical communication, with a view to determine whether any inclusive system can be found which will enable the electrical corporations to establish such communications.

"*Resolved*, That it is the sense of this meeting that the public desire to relieve the thoroughfares from poles and wires is quite in accord with the wishes of the corporations, and that the true interest of the shareholder is to be found in a permanent, inclusive and protected system.

"*Resolved*, That the problem presented to the corporation and the electrical engineers is complex and difficult, and in the opinion of this meeting has not yet been fully solved; that any system to be adopted must combine the highest efficiency, reasonable economy, and serve inclusive interests; that while it is perhaps possible for trunk line telegraphs to avail themselves of existing desires, it is not possible in the present state of the act for services connecting every house in the city so to do, without an expenditure so vast as to be prohibitory in most instances, and that, therefore, hasty, compulsory legislation is to be deprecated as destructive to useful and indispensable public convenience.

"*Resolved*, That a committee be appointed by the chairman of this meeting, either now or hereafter, at his option, consisting of one delegate from each electrical corporation invited to be present at this meeting, the Governor of the State and Mayor of the city, with power to add to its numbers, which committee shall be authorized to examine the subject in respect to its scientific, mechanical, legal and financial considerations, with power to adopt such course of procedure as may appear advisable to it after such examination, and with the approval of the respective corporations, form a company in the collective interest, and consider such inventions and devices in that behalf as may prove to be indispensable to a successful installation."

The following are the members of the committee appointed:

Governor Cleveland, Mayor Edson and the following representatives of the various electrical companies: H. L. Bailey, Time Telegraph Company; D. H. Bates, Western Union Telegraph Company; A. B. Chandler, Fuller Electrical Company; W. A. Childs, Law Telegraph Company; H. Cummins, Postal Telegraph Company; L. E. Curtis, United States Electric Light Company; J. P. Davis, Metropolitan Telephone and Telegraph Company; S. B. Eaton, Edison Electric Light Company; C. R. Flint, Western Electric Light Company; R.R. Hazard, Gramme Electrical Company; E. Holmes, Holmes' Burglar Alarm Telegraph Company; C. D. Hotchkiss, Mutual District Messenger Company; W. M. Ivins, Jablochkoff Electric Lighting Company; F. R. May, American Rapid Telegraph Company; T. J. Montgomery, Brush Electric Company; G. S. Mott, Bankers' and Merchants' Telegraph Company; H. W. Pope, Manhattan District Telegraph Company; C. W. Price, Baltimore and Ohio Telegraph Company; A. C. Richards, Automatic Signal Telegraph Company; J. Eliot Smith, Fire Department Telegraph; Elihu Thomson, American Electric Company. Representatives of the Gold and Stock Telegraph Company, the Mutual Union Telegraph Company, and the American District Telegraph have yet to be appointed.

Mr. J. P. Davis was elected chairman, R. W. Blackwell, treasurer, and W. C. Behrens, secretary. Messrs. J. P. Davis, R. R. Hazard and Frederick H. May were appointed to present nominations at the next meeting for the permanent sub-committees.

The Mayor of Hartford, Conn., states the lighting of the streets of that city, involving an expenditure of $46,647.51, has not in many respects been satisfactory to the public. While it is claimed that the gas in use is of excellent quality, the results do not seem to sustain this claim.

Application has been made by the Portable Electric Light Company of Boston to the Post-Office Department at Washington, for a rescinding of the order of April 12, by which it is proposed to exclude the company from the mails.

ON WATER ANALYSIS.

One of the most interesting of the documents contained in the appendix to the Report of the Medical Officer of the Local Government Board for 1881, is a report by Dr. Cory on the results of examination of certain samples of water purposely polluted with excrements from enteric fever patients, and with other matters. The object of the inquiry was to ascertain how far some of the processes in common use among chemists for water analysis could be relied upon to detect dangerous pollutions, and the results are stated as follows:

"Firstly, with regard to the permanganate process. This method as usually conducted and known as the Forchammer process is not satisfactory. Applied to the examination of waters polluted with differing amounts of the same organic material, it does indeed tell the direction of the differences and even give some indications of the relative amounts. But for the process to show as much as this, it is important that the circumstances of the several samples shall have been identical. * * * The test affords no indication of the total amount of oxidizable material contained in the water, and cannot therefore be employed in comparing water from different sources. * * Secondly, with regard to the albuminoid ammonia process of Messrs. Wanklyn and Chapman. This again may be trusted to show which of two samples of water is the more polluted, when the polluting material contained in each is of the same kind; also in that case, and when the absolute amount of polluting material is not great, it is capable of determining the relative degree of pollution in a number of samples.

"But when the polluting material is in large absolute quantities, a given difference in the extent of pollution is not indicated by corresponding difference in the yield of albuminoid ammonia (see table).

"Equal amounts of albuminoid ammonia may be furnished by extremely different quantities of nitrogenous polluting material, and conversely extremely different quantities of albuminoid ammonia may be furnished by one and the same quantity of nitrogenous polluting material, and this is the case even though the polluting substances differ no more *inter se* than one typhoid stool differs from another stool. When a typhoid stool is compared with a healthy stool obtained under somewhat similar conditions of diet, water polluted with the healthy stool yields to this process a larger amount of albuminoid ammonia than water polluted by the same quantity of typhoid stool."

A preference is expressed for the combustion processes, with the object of determining the amounts of carbon and nitrogen present. These processes were found to indicate with a considerable degree of accuracy the amounts of albumen or urea added to samples of water.

As regards the distinguishing by chemical tests waters polluted by typhoid excreta—the conclusion is the same as that reached by the commission employed by our own National Board of Health to investigate the same subject, viz.: that there is no means at present at our command for distinguishing such dangerous forms of excremental pollution.

Analysis referred to.	Nature of Pollution.	Intentional pollution. Grains of stool per gallon.	Estimated amount of solid dry soluble matter. Grains per gallon	Resulting Increments in Grains, per Gallon. Of solid dry residue.	Of albuminoid ammonia.	Of oxygen absolved from permangan te of poison.	Of chlorine.
Ex. I	Typh. Stool	1.75	.106	.0	.002	...	.0
Ex. V	Health Stool	1.75	.106	.56	.0059	.1717	.0
Ex. I	Typh. Stool	3.5	.21	.28	.0048	...	.0
Ex. II	"	3.5	.21	.28	.0045	.1481	.0
Ex. III	"	3.5	.21	.28	.0021	.0970	.035
Ex. V	Health Stool	3.5	.21	.84	.0216	.1533	.07
Dupre P.	Typh. Stool	3.5	.21	.56	.001	.0097	.0
Frankland	"	3.5	.21	.392	...	...	.07
Wanklin	"	3.5	.21	...	.0014	...	.0
Ex. III	"	4.37	.267	.28	.002	.1678	.07
Ex. II	"	5.25	.32	.14	.0084	.1641	.0
Ex. VII	"	7	.427	.0	.0027	.0970	.035
Ex. III	"	8.7	.533	.28	.0138	.1936	.07
Ex. VII	"	14	.85	.56	.0075	.0650	.0
Ex. X	"	135.1	8.24	5.20	.0267	1.023	.0

Dr. Buchanan sums up the result of the inquiry as follows:

"The lesson is taught afresh and significantly by Dr. Cory's report, that while we must ever be on the watch for the indications that chemistry affords of contaminating matters gaining access to our waters, we must (at any rate until other methods of recognition are discovered), go beyond the laboratory for evidence of any drinking water being free from dangerous organic pollution. Unless the chemist is well acquainted with the origin and liabilities of the water he is examining, he is not justified in speaking of a water as "safe" or "wholesome," if it contains any trace whatever of organic matter; hardly, indeed, even if it contains absolutely none of such matter appreciable by his very delicate methods. The chemist can, in brief, tell us of impurity and hazard, but not of purity and safety. For information about these we must go, with the aid of what the chemist has been able to teach us, in search of the conditions surrounding water sources and effecting water services.

ON THE ACTION OF CERTAIN VEGETABLE ACIDS ON LEAD AND TIN.

The March number of the *American Chemical Journal* contains a paper under the above title, by Francis P. Hall, which is of practical interest and importance in a sanitary point of view. The author remarks that the enormous and continually increasing use of canned goods brings up the question of the possible injurious effect of the material of the can on its contents, and of the effect of various vegetable acids on the material of the cans or the exposed solder. His first experiments were upon the action of vegetable acids on alloys of lead and tin, and from these it appears that alloying with tin increases the corrosion of the lead, or that the alloy is more acted on than either of the metals. In the absence of air, as in sealed cans, acids had very little effect on the alloys. But when weak acids were placed in the ordinary cans, and the latter were left open, the tinning was rapidly dissolved. The conclusion from this is that when a can is opened it should be emptied at once, and not be set aside half full.

The next investigation was into the quality of the tin plate of which cans are made. Mr. Hall concludes that tin-ware and fruit cans are made of "bright plate," coated with pure tin, and not, as has been alleged, from "terne plate," which is used for roofing purposes.

He says: "I procured some specimens of plate through the kindness of one of the largest importing houses in the city. These I tested by several methods. With the bright plate, taking small pieces, I could find no lead at all, and only after taking half a square foot did I find a trace. This was no more than would be found in most English bar-tin. I now tested a number of cans from various sources, as well as the worst looking tin-ware from the so-called 5-cent stores, but not once did I find enough lead to show an intentional adulteration. Neither have I found any well-instituted attack on the character of the tin-plate in this country. A good deal has been said, and many suspicions thrown out, but the only statements of analysis that I have seen are in a Board of Health report of a Western State. The author found lead so invariably in all tin articles that came into his hands that one cannot help suspecting that the methods of analysis were unreliable. He even observes that he found a considerable quantity of lead in what was sold for pure tin—a thing quite possible, it is true, but not likely to happen with dealers to whom a chemist would naturally go for pure supplies.

Even if the tin of the can is pure, there remains the solder, which always contains a large quantity of lead, and is used very freely. There remains, also, the fact that the vegetable acids act considerably upon tin itself. There are many published statements as to the presence of tin in canned goods, and the careful inspection of the inside of a can which has contained an acid fruit shows quite clearly, in many cases, that corrosion has taken place. Moreover, although my experiments tend to show that the amount dissolved when the air is excluded is much less than when open, still it is an appreciable quantity; and if, as seems to be the case, the amount increases with the time, that dissolved from an old can must be considerable.

The terne plate, which is that most often used for roofing, cannot be considered quite harmless in cases where the water from the roof is used for household purposes. But as the tin roof, as well as the whole house, is generally covered with a paint containing far more lead than the terne plate itself, it would be absurd to complain while we use white lead to such an extent as at present.

Although constantly on the watch for tin-ware made of terne plate, I have been able to find none. I am informed,

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on good authority, however, that it is sometimes used for that purpose, but conclude that such use must be rare in this section of the country.

ON COMMERCIAL TIN FOIL.

Tin foil is so much used now-a-days on chocolate, compressed yeast, cheese, and the like, that I thought the analysis of a few samples might not be amiss. Here at the outset we have a good proof of adulteration, from the fact that the price of most foil is but little more than half the price of pure bar tin.

I collected a number of samples from different importers and manufacturers. They varied greatly in thickness, coloring and design, but I had reason to suppose that many were the same in composition. I took what I thought was a fair sample of them, as regarded composition, and analyzed them.

The results of the analyses will be found in Table V. I give in the table the size of the piece of foil taken for analysis, its weight, and the weight of the lead and tin found in it, as well as the percentage of composition. Only the first three foils were sold for pure tin. Some were sold as "composition foils," but generally, unless special inquiry was made, nothing was said of their composition.

TABLE V.

No.	Amount taken.		Amount found in grains.		Percentage.	
	Size in sq. in.	Weight in grains.	Tin.	Lead.	Tin.	Lead.
1	6	0.2285	0.2275	.....	99.53	.....
2	6	0.4260	0.4227	.....	99.23	.....
3	6	0.5950	0.5929	.....	99.65	.....
4	6	0.5150	0.1162	0.3945	22.56	76.60
5	6	0.9080	0.0902	0.8752	9.94	89.95
6	6	0.7140	0.1642	0.5464	23.00	76.41
7	6	2.0785	0.0839	1.9860	3.86	95.75
8	6	1.8580	0.1172	1.7360	6.31	93.43
9	6	0.3030	0.1125	0.1819	37.44	60.03
10	2.25	0.4720	0.1078	0.3678	22.84	77.94
11	3	0.8005	0.2004	0.5969	25.03	74.55
12	6	1.4940	.....	1.2240	.....	81.92

In order to see if I had a fair sample of the foils in general use, and to see which of them were most used on articles of food, I took several foils that had been in actual use and analyzed them. The results appear in Table VI. It will be seen that each corresponds very nearly to some one in Table V. Nos. 21, 23 and 28 were on chocolate; Nos. 22 and 27 on different kinds of compressed yeast; Nos. 25 and 26 on "Neuchâtel" cheese; No. 24 on the outside of a box of troches; No. 23 was on a small cake of chocolate bought at a street stand, while No. 28 was an embossed foil, and on a very fashionable cake of chocolate; No. 25 was very brittle, and showed signs of being acted upon. The cheese was quite acid to litmus.

TABLE VI.

No.	Amount taken.		Amonnt found in grains.		Percentage.	
	Size in sq. in.	Weight in grains.	Tin.	Lead.	Tin.	Lead.
21	6	0.2650	0.2653	.....	100 10	.....
22	6	0.5145	0.5130	.....	99.70	.....
23	6	0.2560	0.2559	.....	99.96	.....
24	6	1.1175	0.1111	1.0040	9.94	89.87
25	..	1.1600	0.2570	0.8733	22.15	75.27
26	..	0.7915	0.1645	0.5793	20.77	73.19
27	6	0.4435	0.4419	.....	99.63	....
28	2	0.4850	0.0938	0.3879	19.34	79.99

Reviews of Books.

A MANUAL OF CHEMICAL ANALYSIS AS APPLIED TO THE EXAMINATION OF MEDICINAL CHEMICALS. Third revised edition. By Frederick Hoffman, A.M., Ph. D., and Frederick B. Power, Ph. D.

Dr. Hoffman's "Examination of Medicinal Chemicals" has been, in past years, especially valuable to those students and practical pharmacists whose lack of preliminary chemical training rendered impracticable the use of the more abstract treatises on analysis. The careful explanation of general and special processes, together with a considerable number of well-chosen illustrations, served to make easy to the beginner many otherwise difficult manipulations.

The third edition, just issued, maintains the same general character, appearance and objects which distinguished the former editions.

The first part is devoted to operations and re-agents, and includes a scheme for inorganic qualitative analysis, simple and very excellent description of volumetric analysis, and a short chapter on the separation and identification of the common poisonous alkaloids.

The second part treats of the individual chemicals and the proper tests for identity and purity. Many illustrations used in the first part are several times repeated in the second. Owing to the greater stringency and minuteness of the tests in the new pharmacopœias of the United States and of Germany, there is less remaining to be explained than formerly, and it is noticeable that the authors have often followed very closely the wording of the U. S. Pharmacopœia. Instance the descriptions of piperine and cinchonidine sulphate.

There is, however, considerable valuable information from outside sources, such as the results of recent investigations of assay schemes for opium and cinchona barks.

Following are tables of molecular weights, thermometric equivalents, weights and measures, and a good index nearly free from errors.

Taken as a whole, this is a book of very considerable value, first and chiefly to those who make occasional tests of commercial chemicals; and secondly, as a book of reference for busy analytical chemists.

The book contains about six hundred pages, and is well printed, bound and illustrated.

ELEVENTH ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD, 1881-82. SUPPLEMENT CONTAINING REPORT OF THE MEDICAL OFFICER for 1881. XXIV, 326 pp. 8vo.

This report by Dr. George Buchanan, with the appended documents, is of no less interest and value than its predecessors, and those who are familiar with the preceding volumes will understand that this means a great deal. Commencing with the subject of vaccination some interesting facts are given with regard to those who died of small-pox in London during the year 1881, especially with regard to children under 10 years of age, based on a special report made by Dr. H. Stevens.

The population uuder 10 years of age in London was 55,000 unvaccinated and 861,000 vaccinated, and the number of deaths from small-pox was 782 among those not vaccinated and 125 among those vaccinated. The mortality from small-pox among the unvaccinated was therefore about a hundred times greater than that among the vaccinated.

The 125 children under 10 who died of small-pox after an alleged vaccination have to be reduced to 117 by deduction of those who were discovered on inquiry to have been unsuccessfully vaccinated, and this number, 117, divides into 82 vaccinated by private practitioners and 35 by public vaccinators.

The number of London children under 10 who have been vaccinated is made up in about equal numbers of those vaccinated by private practitioners, and of those vaccinated at the public expense. The mortality is therefore much greater among those privately vaccinated and as these comprise the children of the upper classes, who run less risk of small-pox infection than the poor, it is evident that there must be some special cause for this.

Dr. Buchanan's explanation is that there is a form of private vaccination in London which offers itself in competition with public vaccination, and which parades its inefficiency as a reason for its acceptance.

Its professors say to young mothers "do you come to me and I won't hurt your baby; I'll make only one place on its arm, not four, as those public vaccinator, do." It seems to us that the best remedy for this sort of competition would be to make public the name of the vaccinator in every case of death by small-pox under the age of 10 where only a single insertion was made.

Dr. Ballard has commenced a systematic investigation into the nature and causes of summer diarrhœa, selecting for this purpose the town of Leicester which has for a long time been pre-eminent for its high death rate from this cause. Dr. Buchanan remarks that an immediate result from his labors is not to be expected but that the inquiry is well worthy of the time and pains that it is intended to bestow upon it.

It is in inquiries of this kind requiring much time and labor, and the comparison of data derived from different places, that a central health organization can alone do work of real value.

Dr. Ballard furnishes a report on an epidemic of scarlet fever in Halifax, from which it appears that while the disease spread by contagion in the ordinary way it was connected with a particular milk service from a place crowded with cases of the disease.

An important report is made by Dr. Cory on water analysis, a summary of which is given on another page of this journal.

Dr. E. Klein furnishes an important paper on the relation of pathogenic to septic bacteria, in which he in the main sustains Koch's criticisms upon Bushner and Pasteur, and gives many valuable details as to methods of experiment in this difficult subject.

Mr. Victor Horsley gives a report on septic bacteria and their physiological relations, which is a very complete summary of what is known on this subject, and is accompanied by a good bibliography. The last paper in the appendix is by Dr. Thudicum, being a continuation of his studies in the chemistry of the brain.

It is impossible in such a notice as this to do more than indicate the great value of this volume, and to say to every one interested in sanitary work that it is one which he must obtain and read carefully. We heartily congratulate Br. Buchanan on the evidence of scientific work in the right direction which it presents, and advise our own State Board of Health to take it as a pattern example.

The Perth Amboy Terra Cotta Company has issued a handsomely gotten up catalogue and price list of architectural terra cotta. There are 23 plates with upwards of 150 separate figures on heavy buff paper, accompanied by a separate indexed price list, which will be of service to architects, builders and house-owners.

BOOKS RECEIVED.

CAMERON'S PLASTERERS' MANUAL. Revised Edition. By K. CAMERON. New York: William T. Comstock, 1883. pp. 80. Illustrated.

THE STORAGE OF ELECTRICITY. By HENRY GREER, Member of the New York Electrical Society.

FIRST ANNUAL REPORT OF THE PROVINCIAL BOARD OF HEALTH OF ONTARIO, being for the year 1882.

CITY OF LIVERPOOL. NOTIFICATION OF INFECTIOUS DISEASES, EVIDENCE, ETC. REPORT OF MEDICAL OFFICER OF HEALTH. REPORT AT A SPECIAL MEETING OF THE HEALTH COMMITTEE.

We have received Dr. Carlos MacDonald's TWENTY-THIRD ANNUAL REPORT OF THE SUPERINTENDENT OF THE STATE ASYLUM FOR INSANE CRIMINALS, AUBURN, N. Y., for the year ending September 30, 1882.

PROCEEDINGS OF THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY, at its fifth annual meeting at Jackson, Miss., April 3 and 4, 1883.

REPORT OF PROCEEDINGS OF THE ILLINOIS STATE BOARD OF HEALTH. Quarterly Meeting, Chicago, April 12-14, 1883.

CIRCULARS OF INFORMATION OF THE BUREAU OF EDUCATION, No 4, 1882, INDUSTRIAL ART IN SCHOOLS. By CHARLES G. LELAND, of Philadelphia. Washington Government Printing Office.

TRANSACTIONS OF THE STATE MEDICAL SOCIETY OF WISCONSIN, 1882.

ADULTERATION OF CEMENT.

The German Union of Cement Manufacturers has decided that, leaving apart the question whether certain mixtures are useful or otherwise, any mixture must be regarded as an adulteration, unless it be so declared and marked upon the sack or barrel. The only exception made was in favor of certain substances like plaster of Paris, the addition of not more than two per cent. of which improves the cement. The most usual form of adulteration consists in adding the powdered slag from blast furnaces, which gives the cement a fine greenish tint, the usual sign of high burning, and of great density, thus deceiving those who judge of a cement by its weight.—*Journal of the Society of Arts, Feb. 2.*

RICHMOND, VA.—Reports from Essex County state that small-pox is raging there and the people are almost panic stricken.

WOODBURY.—The small-pox excitement which was turning Woodbury topsy-turvy a few weeks ago, suddenly fell to zero. Dr. Dickens, of Readyville, an old physician of much small-pox experience, was sent for and soon declared the so-called cases to be nothing but measles.

An electric motor, invented by Mr. George Daft, has been experimented with for some months back on a line of track near Greenville, N. J. A company has been formed with $500,000 capital to apply the motor to street railways in Newark.

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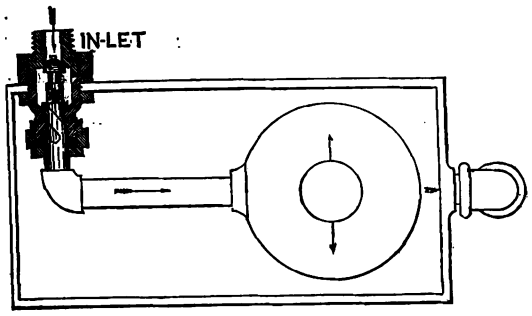
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

STEAM TRAP.

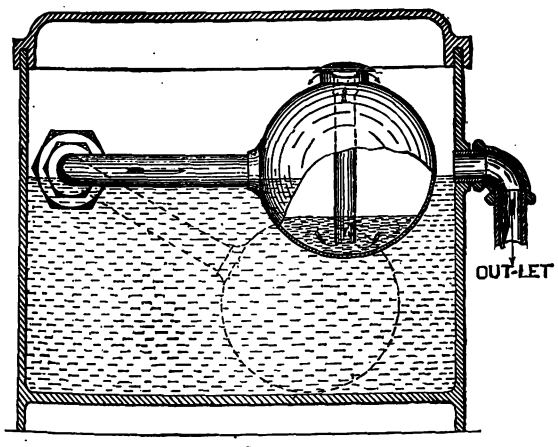
We reproduce this week from "Engineering" a steam trap made and used in England, which presents some novel features.

The inlet to the trap, which is also of course the outlet of the pipe that is to be drained, is commanded by a small loose valve, alternately forced to its seat and released by



PLAN.

the rotation of a quick threaded screw spindle. The loose valve and spindle form a prominent feature of the invention. They are the only parts of the apparatus that are subject to friction, and as the two are independent the spindle can never be fixed by the temporary sticking of the valve. The spindle is controlled by a lever and a ball, all three being hollow, and together forming a channel for the water that enters through the valve to pass into the tank. The ball when empty is buoyant, but when filled with water it sinks, and it is the alternate filling and emptying of the ball that furnishes the motive power for opening and closing the valve. The action is as follows: Supposing the ball to be in the position shown in the figure, and to be filled with steam, a vacuum will be more or less quickly formed in it by condensation, the empty space being occupied by water that enters from the tank through a small hole not shown in the drawing. When nearly full the ball will sink into the position indicated in dotted



SECTION.

lines, and in so doing will rotate the screwed spindle and release the valve. The whole of the water accumulated in the steam pipe will then flow into the ball, and be driven, by the steam pressure behind it, up the dip pipe which forms the outlet of the ball, and escape through the tank. After all the water has been ejected the ball, being again full of steam and becoming buoyant, will rise and close the valve, which it will maintain shut until the steam is condensed, and the cycle of operations is again commenced. The frequency of the action of the trap is regulated by the size of the leak hole in the ball and the temperature of the water in the tank, and is independent of the pressure of the steam.

Messrs. Lancaster & Forge, of Pendleton, England, are the manufacturers.

Construction Notes.

CINCINNATI.—A bill transferring the control of the Cincinnati Water Works from the Board of Public Works to a board of five trustees has passed the Ohio Legislature. The trustees are authorized to enter into a contract with a private company for pumping the water into the reservoirs. These trustees are to be appointed by the Superior Court, and any contract made by them must be approved by the Commissioners of the Sinking Fund of the city.

BENNETTSVILLE, S. C.—The county commissioners of Marlboro County will receive proposals for building a court house until May 6; cost $20,000.

QUEBEC.—C. Baillairge, city engineer, will receive proposals for additional and improved water supply for the city, from Lorette, a distance of about nine miles, until May 15.

BRATTLEBORO, VT.—A water-supply is about to be introduced into Brattleboro, Vt. Mr. Geo. E. Crowell has brought water from several springs about a mile from the village into a reservoir, which when completed, will contain some 4,000,000 gallons.

MICHIGAN.—The Senate has passed a bill to authorize the formation of corporations in the upper peninsula, for the purpose of excavating, constructing, and maintaining water courses with water power appurtenant thereto, for furnishing, upon an agreed rental, water and water power, for mining, milling, manufacturing, domestic, municipal, and agricultural purposes.

LANSINGBURGH, N. Y.—A bill was passed April 24, in the Senate at Albany, for providing Lansingburgh with a supply of pure water and proper drainage.

NEWPORT, R. I.—The Beach Improvement Company has received a report from Mr. Frederick Law Olmstead, as to the best plan for improving a large tract of mud flats which is an obnoxious feature near the beach. He advises dredging out channels and piling the mud and sand removed in ridges between the channels and around the outside of the flats. The ridges to be planted and the outer bank to be made a drive and promenade. The estimated cost is about $150,000.

CINCINNATI.—The Board of Public Works has purchased the right of using the Bell waterphone forever at a cost of $15,000.

SEATTLE, W. T.—Work was begun April 9 on the new system of water works.

COLUMBIA, TENN.—The proposition of Travers Daniel to build a system of water works was voted on April 14, and adopted by a large majority.

WILLIMANTIC, CT.—The House resolution, providing for water supply of Willimantic, has also passed the State Senate.

QUINCY, MASS.—A bill has been reported from Senate Committee on Water Supply and Drainage to incorporate the Quincy Water Company with a capital not exceeding $250,000.

HAMILTON, OHIO—The trustees of the water works will receive proposals until May 30 for 4,100 tons of cast iron water pipe, classified as follows: 5,500 lineal feet, 590 tons of 20.inch pipe; 7,900 lineal feet, 610 tons of 16-inch pipe; 5,100 lineal feet, 250 tons of 12-inch pipe; 8,000 lineal feet, 300 tons of 10-inch pipe; 31,400 lineal feet, 880 tons of 8-inch pipe; 69,400 lineal feet, 1,220 tons of 6-inch pipe; 21,000 lineal feet, 250 tons of 4-inch pipe. J. D. Cook, Toledo, Ohio, Consulting Engineer.

FRANKLIN, MASS.—The Senate Committee on Water Supply and Drainage have reported a bill to incorporate the Franklin Water Company, capital $75,000.

A bill has passed the Connecticut House incorporating the Safford Springs Aqueduct Company.

FLORIDA.—The Okeechobee Drainage Company is progressing in draining the Florida peninsula. The work is done under contract with the State, and is under the charge of J. L. Kreamer, C. E.

MEXICO.—A company, with Hon. George B. Loring as president, has on hand the project of draining the valley of Mexico. Estimated cost of the undertaking, $10,000,000.

CONCORD, MASS.—The following bids for constructing a distributing reservoir were received by Wm. Wheeler, C.E., for a 2,000,000 gallon distributing reservoir for the town of Concord, Mass., April 7:

Conrad Juul, Danvers, Mass., $10,230.50; Richard Shanahan, Portland, Me., $10,233.25; Thos. Hennessey, Holden, Mass., $11,458.00; Hill & Ellinwood, Lowell, Mass., $12,953.00; John T. Langford, Newton, Mass., $13,942.00; A. F. Williams, Boston, $15,422.50; O'Connor & Carmody, Boston, $16,220.00; Henry H. Pike, Cambridge, $20,793.00; Geo. W. Hendrick, Easthampton, Mass., $23,215,50. The contract was awarded to Conrad Juul.

The following bids were received by Wm. Wheeler, C.E., April 7, for furnishing and laying 31,695 feet of wrought iron and cement pipe, 6 to 10 inches:

John E. Halladay, Jersey City, $28,336.75; Goodhue & Birnie, Springfield, Mass., $28,541.50; Conrad Juul, Danvers, Mass., $31,361.00; H. H. Pike, Cambridge, Mass., $43,160.00.

Bids for cast iron pipe, same quantity and dimensions, were received as follows:

John T. Langford, Newton, Mass, $35,195.75; Hill & Ellinwood, Lowell, Mass., $35,336.70; J. J. Newman, Providence, R.I., $36,900.75; Davis & Farnum Mfg. Co., $37,044.35; Conrad Juul, Danvers, Mass., $37,355.65; John E. Halladay, Jersey City, N. J., $38,567.35. John E. Halladay received the contract.

DAYTON, OHIO.—The following bids for cast iron pipe and special castings were received by M. R. Patrick, Governor, April 20, 1883, for sewer extension at the National Soldier's Home, near Dayton, O.: Cincinnati & Newport Iron and Pipe Co., $36 90 per ton, and 3¼ cents per lb.; A. H. McNeal, Burlington, N. J, $42.18 per ton, and 3½ cents per lb.; Dennis Long & Co., Louisville, Ky, $39 per ton, and 3½ cents per lb.; R. D. Wood & Co., Philadelphia, $37.50 per ton, and $3¼ cents per lb. The contract was awarded to the Cincinnati and Newport Iron and Pipe Co., of Newport, Ky.

CHICAGO.—E. W. Blatchford received the contract to supply 50 tons of pig lead to the city at $4.32½ for 100 pounds.

Bids as follows for an iron roof for the North Side Pumping Works have been received, and the first named will get the contract: H. A. Streeter, $22,722.50; Delaware Bridge Co., $23,744; Lassing & Alden, $25,400; Detroit Bridge Co., $24.570; Rust & Co, Rust & Coolidge, $24,762.

Proposals for dredging shallow places in Chicago River have been received from the Chicago Dredge & Dock Co., the Green Dredge Co. and Harry Fox & Co., at the following average prices respectively, for the nine sections of the river: 46⅓ cents for sounding; 46⅞ cents and 54 cents.

Abstract of proposals for the work on improvement of Hot Springs Creek, Ark., including rock and earth excavation, vitrified and iron sewer pipe, and granite masonry, opened at Interior Department, April 23, 1883. We give the bids for the pipe and the totals:

BIDDERS.	Vitrifi'd pipe. 12-inch.	Iron pipe. 12-inch.	Total.
Jay Marshal, Washington, D. C.	$7,150	$1,440	$62,070
Arthur Flynn, " "	6,875	1,200	74,625
Geo. H. Bardwell, " "	2,200	1,128	78,089
James Reynolds, " "	6,875	1,200	79,425
J. J. Power, " "	8,415	1,836	81,284
Howell & Hand, New York	9,900	3,000	85,875
J. H. Dewes, Washington, D. C.	3,575	1,080	87,355
Chas. McCreanor, Carlisle, Ark.	3,025	780	87,725
Rus. Evans, Washington, D. C.	5,445	1,040	88,659
W. H. Adams, " "	15,750	960	90,490
Earle, Miller & Paterson, St. Louis, Mo.	8,250	1,500	92,700
Albert Gleason, Washington, D. C.	5,500	1,800	92,900
Gleason & Malony, " "	8,250	1,920	93,820
Chas. Sooy Smith, Chicago	5,390	1,428	94,368
H. C. Fletcher, Little Rock, Ark.	5,170	1,644	94,541
Dennis H. Hayes, Chicago	5,500	1,500	96,150
C. H. Bliss, Washington, D. C.	9,900	2,100	99,130
John G. Noakes, Scranton, Pa.	4,900	1,500	99,400
Jos. G. Loane & Co., Baltimore, Md.	5,225	1,380	99,905
Aldritch, Welschbellig & Co., Hot Springs, Ark.	6,875	2,100	102,525
Sullivan & Donnelly, Baden, Mo.	4,950	996	102,746
Cyrenius Johnson, La Fayette, Ind.	5,500	1,800	104,950
W. B. Sherman, Topeka, Kansas	9,185	1,736	105,678
M. A. McGowan, Washington, D. C	4,950	1,200	106,050
Wm. Bugnell, St. Louis, Mo.	4,675	1,260	108,235
Asa P. Robinson, Conway, Ark.	4,950	1,800	115,600
W. S. Oliver, Little Rock, Ark.	5,225	2,100	126,125
John McKim, New York	3,685	1,940	127,175

GOVERNMENT WORK.

Custom House and Post Office, Albany, N. Y.

Synopsis of bids for encaustic floor tiling: E. Boote,

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New York, $5.520; American Encaustic Tile Co., $4,400; United States Encaustic Tile Co., $5,390; T. Aspinwall & Son, $3,825. Contract awarded to American Encaustic Tile Co.. at $4,400.

The contract for the stone work for the basement and area walls of the new post office and court house at Jackson, Miss., has been awarded to the Belknap and Dumesnil Stone Company, of Louisville, for $10,280 and the contract for furnishing heating apparatus for the court house and post office at Charleston, W. Va., to Bartlett, Hayward & Co., of Baltimore, for $7,948.

Court House, Topeka, Kansas.

Synopsis of bids for heating apparatus, received under advertisement dated April 4, 1883, and opened April 24, 1883: Samuel J. Pope & Co., $13,479; Bartlett, Hayward & Co., $15,448, Brooks & Kemper, $15,700: Frederick Tudor, $16,667.

Among the bids for work and materials for reconstruction of eastern portion of Smithsonian Institute, received April 26, were, for iron stairs: George E. Noyes, $2,054.-99; Pettit & Dripps, $1,302.65; Peckham & Middleton, $1,439.64; George White & Co., $948; E. N. Gray & Co., $1,737.52; Samuel J. Cresswell, $2,000; Bartlett, Hayward & Co., $2,365; C. A. Schneider & Sons, $1,511.-33. Iron beams, E. N. Gray & Co., $8,156.69; C. A. Schneider & Sons, $8,219; Bartlett, Hayward & Co., $9,-500; J. H. McGill, $8,789; Phœnix Iron Co., $12,175.

Custom House, Albany, N. Y.

Synopsis of bids for marble mantels, hearths, and skirting received under advertisement of April 6, 1882, and opened April 24, 1883:

	Am't for all work except skirting.	Time.	Skirting. Walls and corridors.	Line of stairways.	Line of P. O. screen.
Chas. E. Hall & Co..	$2,297.00	2 mos.	Dove marble..... $1.90	$2.75	$0.60
Davidson & Sons.....	2,682.00	4 mos.	Shell marble..... 1.50	2.50	.45
			Knoxville marble, 1.95	2.80	.65
			Rutland or Knoxville marble..... 1.68		
Emil Frilsch.....	3,360.00	3 mos.	Vt. Dove..... .86	2.25	.89
			Knoxville or Dark Tenn.....	1.10	.39
Adolph Klaber.....	3,496.00	3 mos.	Italian blue..... .94	1.20	.43
Bowker, Torry & Co..	3,768.00	.....	Dove, Vt..... .98	1.62	.33
S. Klaber.....	5,379.00	.....	..... .95	1.58	.31
			Rutland grey..... 1.40	1.70	.65
Robt. C. Fisher.....	3,600.00	...	Italian grey..... 2.12	2.73	.45
		.....	..... 2.40	3.13	.55
			..... 1.50	2.50	2.00

No award yet.

YORKTOWN, VA.—The contract for building the monument at Yorktown, Va., has been given to the Hallowell Granite Company, of Maine. It will be ninety-seven feet high, and will cost $66,752.

The Cincinnati and Newport Iron and Pipe Co. have been awarded the contract for the water works at West Bay City, Mich.

The plumbing and heating of the new Powers hotel at Rochester, has been awarded to E. H. Cook & Co., of that city.

A bill apportioning $30,000 for an experimental lock on the Erie Canal was ordered to a third reading in the Senate, April 24.

ORGANIZATION OF NEW COMPANIES.—The Lancaster Manufacturing Company of this city, capital $250,000, for manufacture of stocks, dies and pipe tools. The U.S. Fire Escape and Fire Alarm Company, also of this city, capital $200,000.

The Sewer Gas Mercury Seal Co., of Philadelphia, has been chartered by the State of Pennsylvania as a stock company. Capital $60,000.

NEW YORK.—The following contracts were awarded at the Office of the Commissioners of Public Works, April 27:

For paving with granite-block pavement, and laying cross-walks, the following: King St., to W. Kelley for $17,082; Oliver St., to W. Kelley for $8,005; Jane St., to W. Kelley for $6,104: Watts St., to Thomas Gearty for $6,600.80; Mulberry St., to W. Kelley $10,512.50; 11th Avenue, to W. Kelley for $23,980.

For paving with trap-block pavement, and laying cross-walks, the following: Norfolk St., to W. A. Cumming for $14,035.30; West 11th St., to P. H. Fitzgerald for $2,467; 17th St., to M. Shannon for $15,830; 18th St., to W. A. Cumming for $3,042.50; 35th St., to P. H. Fitzgerald for $5,239; 35th St., to P. H. Fitzgerald for $4,692.60.

At the hall of the Board of Education, April 27, the contract for erecting two iron stairways to Grammar School-house, No. 18, was awarded to Matthias Benner for $3,577.80.

The Secretary of the Navy is about to receive proposals from American ship builders for one steel cruiser of 4,500 tons displacement, two steel cruisers of 3,000 tons displacement, and one dispatch boat of 1,500 tons displacement.

CHARLESTON, S. C.—After a series of unfortunate accidents in the sinking of a new well, the Water-Works Company, of Charleston, S. C., is now in a fair way to get an abundant supply of water.

In the Massachusetts Senate the Committee on Water Supply and Drainage, on the petition of the cities of Boston of Cambridge and the town of Andover, for leave to take the water of the Shawsheen River for a water supply, reported that they recommended further consideration of said several petitions be referred to the next General Court. They also recommend that as the Stony Brook basin in the towns of Waltham, Weston and Lincoln is a more desirable and economical water supply for Cambridge than the Shawsheen project, Cambridge, during the adjournment of the Legislature, ascertain the feasibility of adopting the same as an additional water supply for said city. The committee believe, moreover, that Boston and its contiguous cities and towns should be, in the matter of water supply and drainage, conducted under one comprehensive system, also that Boston reduce her present large waste of water before applying to the Legislature for an increase of water rights.

The Sheffield Highway Committee have issued a report recommending a complete scheme of sewerage and drainage for the borough, based upon utilizing the present sewers as far as possible. The cost is estimated at £147,500, and the system proposed is by filtration beds at Blackburn meadows.

The water revenue of Philadelphia in 1882 was $1,487,-967.71.

The Globe Telephone Company, filed articles of incorporation at Albany last week, for doing a telephone business throughout the United States, capital, $10,000,000.

The Electrical Refining and Manufacturing Company, of California, filed articles of incorporation March 28. Capital $600,000, all subscribed.

Henry R. Worthington, steam pump manufacturer, has removed the New York Office from 239 Broadway to 86 and 88 Liberty street.

Cammeyer & Sayer, manufacturers of Rider Hot Air Pumping Engines, formerly of 93 Liberty street, are now at 19 Dey street.

The George F. Blake Manufacturing Co. have removed from 88 Liberty street to 95 and 97 Liberty street, this city.

The Knowles Steam Pump Works have removed their salesrooms from 86 Liberty street to 93, on the same street.

The State Board of Health of Wisconsin, has issued a circular to town and village boards and common councils of cities calling their attention to chapter 167 laws of 1883, which makes the organization of boards of health and the appointment of health officers obligatory in every town, village and city of the State. The State Board urge the necessity of careful selection of the health officers, and they say—and this should be heeded by local boards—it will always be found both wise and economical to secure as health officer the best physician and sanitarian to be found in any given locality.

THE NEW JERSEY LAW AFFECTING WATER SUPPLY.

The following is the law of the State of New Jersey, to which we referred in our issues of April 12 and 26, when discussing the proposition to bring water from the Ramapo water shed. It will be noticed that this contemplates other actions than suits of individuals for damages.

STATE OF NEW JERSEY.

Sect. 3 (*of chap.* 186. *Laws of* 1883.)

And be it enacted, That said commissioners, whenever they deem such action necessary to preserve the rights of the State from infringement, may commence proceedings in the name of the State of New Jersey, to restrain any other State or any person, or any municipal or other corporation, from diminishing the flow, at the point where it enters this State, of any stream of potable water, by conducting away from such stream, or from sources lying within its water shed, and within the boundaries of another State, any portion of the waters naturally tributary to such stream, or from causing any injury to the waters flowing in such stream, or which are tributary thereto, so as to render such stream and waters, at the point where they enter this State, unfit for the supply of cities and towns for domestic use, and the Attorney-General is hereby required to commence and prosecute such actions as may be instituted or directed by said commissioners as aforesaid; and his expenses and disbursements, and the expenses and disbursements of such assistants as may be appointed by the Governor, and their reasonable charges and counsel fees shall be taxed by the Chief Justice and paid out of the State Treasury on presentation of the bill so taxed.

The act from which the above section, is quoted, was passed by the legislature of New Jersey, March 23, 1883, and is entitled. "An act to amend an act entitled an act to provide for the appointment of commissioners to determine upon plans for the storage of any of the waters of this State, for the purpose of furnishing to cities and towns a joint water supply. Approved March 31, 1882."

RECENT NEW JERSEY LEGISLATION.

An act prohibiting the sale of cigarettes or tobacco in any of its forms to minors.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That hereafter no person or persons in this State shall knowingly sell any cigarette, or cigarettes, or tobacco in any of its forms, to any minor under the age of sixteen years.

2. And be it enacted, That if any person or persons in this, shall violate the provisions of this act, he, she or they shall be liable to a penalty of twenty dollars for each and every such offence; such penalty to be sued for by and in the name of the parent or guardian of such minor, in any court of competent jurisdiction in this State, such penalty to go to the county collector for the use of the county wherein the violation of this act occurs.

Approved March 22, 1883;

A Supplement to an act entitled "An act to regulate the practice of medicine and surgery," approved March 12, one thousand eight hundred and eighty, and a supplement thereto approved March second, one thousand eight hundred and eighty-one.

1. And be it enacted by the Senate and General Assembly of the State of New Jersey, That section two of said supplement, approved March second, one thousand eight hundred and eighty-one be, and the same is hereby amended so that the same shall read as follows:

2. And be it enacted, That any person who shall commence or continue to practice medicine or surgery without conforming to the requirements of the first section of this act, shall be deemed guilty of a misdemeanor, and on conviction shall be punished by a fine of twenty-five dollars, or imprisonment in the county jail not exceeding six months, or both, at the discretion of the court for each perscription made, operation performed, or professional service rendered; provided, that any person who shall have had twenty years experience in the practice of medicine or surgery in one locality, and shall file with the clerk of the county, in which he resides, an affidavit setting forth the fact of such experience and length of practice, shall be exempt from the requirements contained in section first of the act entitled "An act to regulate the practice of medicine and surgery, approved March twelfth, one thousand eight hundred and eighty.

2. And be it enacted, That in order to secure the State Board of Health a full record of all physicians and surgeons who, under the laws of this State, are required to give certificates of death, it shall be the duty of the county clerk of each county of the State, to furnish to the State Board of Health, a list of the names of all physicians and surgeons who have deposited with him copies of their diplomas, together with the date of their respective diplomas, and the name and place of the institution purporting to confer such diploma, and each county clerk shall yearly furnish to the State Board of Health a similar list of those physicians and surgeons hereafter depositing diplomas with him and shall include in such list also the names of those physicians and surgeons filing affidavits with him, as mentioned in the second section of this act; and each county clerk shall keep in a suitable book an index of the names of all physicians and surgeons depositing diplomas or filing affidavits in pursuance of this act or the acts to which this is a

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supplement; and for every name indexed and furnished to the State Board of Health as hereinbefore provided, the county clerk so indexing and furnishing such name shall be entitled to receive from the State Board of Health, through its secretary, the sum of six cents.

3. And be it enacted, That this act shall take effect immediately.

Approved March 22, 1883.

Supplement to an act entitled "An act relating to local boards of health," approved March twenty-second, one thousand eight hundred and eighty one.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That where local boards of health as existing in any township outside of city limits have been formed and exercise powers under an act entitled "An act concerning the protection of the public health and the record of vital facts and statistics relating thereto," approved March eleventh, one thousand eight hundred and eighty, or a supplement thereto entitled "A supplement to an act concerning the protection of the public health and the record of vital facts and statistics relating thereto," approved March thirty-first, one thousand eight hundred and eighty-two, or "An act relating to local boards of health," approved March twenty-second, one thousand eight hundred and eighty-one, said board shall be the only township board or authorities having powers relating to public health as defined in said acts.

2. And be it enacted, That in any city, town, borough or township board of health, constituted and exercising authority under these acts, the power to abate nuisances, sources of foulness or cause of sickness hazardous to the public health, shall not depend upon whether said board shall have exercised their power or privilege to pass, alter, amend or publish ordinances in relation to the public health.

3. And be it enacted, That where any township has no township physician, the State Board of Health may name some graduated physician of the same township, or, if there be none in the township, may name one of an adjacent township, who may be appointed for not more than three years, and who shall serve as a member of the board of health of such township; but if any such township come to have a township physician, said appointment shall be revoked by the State Board of Health.

4. And be it enacted, That every board of health now organized or to be hereafter organized in the cities of this State according to the provisions of the act entitled "An act relating to local boards of health," approved April twenty-second, one thousand eight hundred and eighty-one, under authority of any ordinances of such cities, shall be fully vested with all the rights and powers conferred by said act, and by this act entitled "A supplement to an act entitled 'An act concerning the protection of the public health and the record of vital statistics relating thereto,'" approved March eleventh, one thousand eight hundred and eighty, which supplement was approved March thirty-first, one thousand eight hundred and eighty-two, notwithstanding the charters of such cities, or of any of them, may provide for the exercise of the aforesaid rights and powers, or of any of them, by the board of aldermen or common council of such city, or by a committee thereof.

5. And be it enacted, That a notice by any inspector of any local board of health, to abate a nuisance, or by the executive officer or other authorized member of said board, shall be taken as a notice of the board, but if the owner or person concerned fail to abate the nuisance, the board of health, or a majority of its members, or of any committee thereof, shall view the nuisance before proceeding to abate it, and give such written directions to the inspector in reference thereto as they deem advisable under the law, and he or they shall proceed in accord therewith to abate said nuisance.

6. And be it enacted, That any county, city or township board of health shall have the authority to specify any contagious disease, or diseases in cases of death from which no public funeral shall be had, and to prohibit the same, under penalty of fifty dollars, or in case of the threatening or prevalence of an epidemic to make prohibition of the same as to the particular disease or diseases then prevalent, and any township board of health shall have the same power whenever the attending physician in writing advises the exercise thereof, or whenever any two physicians of the same county certify that they believe the interests of the public health require such restriction.

7. And be it enacted, That any board of health constituted under the act to which this is a supplement, or the acts referred to in section one of this act, may determine whether or when it is necessary for all physicians, or other persons in attendance of the sick, to notify said board of the existence of any contagious or infectious disease, and of which of said diseases it is necessary for the board to have this notification; but where such notification is required, the local board of health shall enter in a book, subject only to the inspection of said board, the name of the physician making such notification, and the date of the notice, the name and precise locality of the disease, and at the close of each six months, said physician shall be entitled to receive, on the certificate of said board, from the usual disbursing officer of said city or township, the amount of twenty-five cents for each and every notification, unless said notification has been found to have been erroneous.

8. And be it enacted, That in any county having a county board of health, this act shall not apply to any city or township of said county, without the consent or approval of the county board of health, nor to any city that has not organized or does not organize a board of health under "An act relating to local boards of health," approved March twenty-second, one thousand eight hundred and eighty-one, or the other acts referred to in section one, of this supplement thereto; and in case any city has or does by the vote or ordinance of its common council or other governing board, approved by the mayor, form a board under these acts, said vote or ordinance shall, as a part of the power of said city, under its charter, cause said board of health and its successors to become the board of health of said city, town or borough, as referred to or provided for in said charter.

9. And be it enacted, That whenever any board of health now organized, or which may be hereafter organized under laws of this State, as referred to in section one of this supplement to an act entitled "An act relating to local boards of health," approved March twenty-second, one thousand eight hundred and eighty-one, shall be notified that a nuisance or other source of foulness, hazardous to the public health, exists within the territory within which the board of health has jurisdiction or control, such board may examine the matter in a summary way and order and cause the same to be abated in the manner herein, or heretofore provided by law.

10. And be it enacted, That any such board of health, instead of proceeding in a summary way to abate a nuisance or such source of foulness, may file a bill in the court of chancery, in the name of the State, on the relation of such board of health, for an injunction to prohibit the continuance of such nuisance or source of foulness, and such action shall proceed in the court of chancery according to the rules and practice in such cases on the relation of individuals, and cases of emergency shall have precedence of other litigation pending at the time in the court of chancery, and may be heard upon final hearing on such notice as the chancellor shall direct.

11. And be it enacted, That in all cases in which it shall be ascertained by the court of chancery in such suits that a nuisance or source of foulness existed at the time of filing such bill, substantially as set forth in the same, the court shall have power to abate the same by injunction or otherwise, according to the practice of the court, and may charge the costs of such suit upon the property whereon such nuisance or source of foulness is found, and enforce the same by sale of said property on writ of *fieri facias*, or so much thereof as shall be necessary for that purpose, or the said court may order the person or corporation which caused said nuisance or source of foulness, or allowed the same to continue, to pay such costs, and enforce obedience to such order.

12. And be it enacted, That in case no nuisance or other source of foulness, hazardous to the public health, shall be found to exist, costs shall not be awarded as of course against the board of health which caused such suit to be brought, but only in case it shall appear to the chancellor that no probable cause existed for bringing such suit.

13. And be it enacted, That this act shall take effect immediately.

Approved March 22, 1883.

A Supplement to an act entitled "An act to prevent the adulteration of food or drugs," approved March twenty-fifth, one thousand eight hundred and eighty-one.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That section one of the act to which this is a supplement be amended so as to read as follows:

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That no person shall manufacture, have, offer for sale or sell any article of food or drugs which is adulterated, within the meaning of this act, and any person violating any of the provisions of this act shall be liable to a penalty of fifty dollars for a first offence and one hundred dollars for a second or any subsequent offence.

2. *And be it enacted*, That section five of the act to which this is a supplement be amended to read as follows:

5. *And be it enacted*, That the State Board shall take cognizance of the interest of the public health as it relates to the sale of food and drugs, and the adulteration of the same, and make all necessary inquiries and investigations relating thereto; it shall also have the appointment and supervision of public analysts and chemists or inspectors to serve for general service, or for such special service or length of time as it may deem necessary; and the board health shall, from time to time, meet and adopt such measures as it may deem necessary for the enforcement of this act, and of the act to which it is a supplement, and prepare rules and regulations with the regard to the proper method of collecting and examining articles of food or drink or drugs; and the analysts, chemists or inspectors appointed may act singly or as associated in a council for such time as may be approved or authorized by said board.

3. *And be it enacted*, That section seven of the act to which this is a supplement be amended so as to read as follows:

7. *And be it enacted*, That any person violating any of the provisions of this act, and any person who shall hinder, impede, obstruct or otherwise prevent any analyst, inspector or prosecuting officer, in the performance of his duty, shall be liable to a penalty of fifty dollars for the first offence, and one hundred dollars for a second or subsequent offence.

4. *And be it enacted*, That every district court in any city, and every justice of the peace in any county, and any police justice or recorder in any city, is hereby empowered, on oath or affirmation made, according to law, that any person or persons who has or have violated any provision of the act to which this is a supplement, to issue process at the suit of any person or persons so charged, which process at the suit of any person, either in the manner of a summons or warrant, against the person or persons so charged, which process shall, when in the nature of a warrant, be returnable forwith, and when in the nature of a summons, shall be returnable in not less than one nor more than ten entire days; such process shall state what provision of the law is alleged to have been violated by the defendant or defendants, and on the return of such process or at any time to which the trial shall have been adjourned, the said court, justice of the peace, police justice or recorder, shall proceed to hear testimony and to determine and give judgment in the matter, without the filing of any pleadings; and the said court, justice of the peace, police justice or recorder shall, if judgment be rendered for the plaintiff, forthwith issue execution against the goods and chattels and person of the defendant or defendants; and the said court, justice of the peace, police justice or recorder is further empowered to cause any such defendant who may refuse or neglect to pay the amount of the judgment rendered against him and all the costs and charges incident thereto, unless an appeal is granted, to be committed to the county jail for any period not exceeding ninety days; but no district court of any city, justice of the peace, police justice or recorder shall have jurisdiction of any offence against the act to which this is a supplement, which offence shall take place outside of the territorial jurisdiction of such district court, justice of the peace, police justice or recorder, as such territorial jurisdiction is now established by law.

5. *And be it enacted*, That the officers to serve and execute all process under this act shall be the officers authorized by law to serve and execute process in said courts, and before such magistrates and officers as aforesaid, including the constables of such counties and all police officers of such cities.

6. *And be it enacted*, That all penalties imposed under the act to which this is a supplement shall be disposed of as follows: In case the suit is brought by an officer appointed by the State Board of Health, the penalty shall be paid into the treasury, this State; in case the suit is brought by any officer of any local board of health, or of any city, borough, town or township, the penalty shall be paid into the treasury of said local board of health, city, borough, town or township; in case of any suit not otherwise provided for, the penalty shall be paid to the person bringing the suit.

7. *And be it enacted*, That the State Board of Health shall be authorized to expend annually, in addition to all sums already appropriated for such board, an amount not exceeding one thousand dollars, for the purpose of including in its work the carrying out of the provisions of this act, and for the protection of the public health.

8. *And be it enacted*, That any analyst or inspector appointed by the State Board of Health, and any inspector or other officer of any local board of health, shall have power to inspect any article of food, or drugs, wherever exposed for sale, or offered, or held for sale, or whether in transit or otherwise; and if, upon inspection of such food or drugs, the same shall be found adulterated within the meaning of this act or the act to which this act is a supplement, the said inspector, or other officers aforesaid, shall have power and may prohibit the sale or disposal of said articles until decision shall be rendered by the court, justice of the peace, recorder, or police justice before whom the defendant may be brought.

9. *And be it enacted*, That this act shall not be so construed as to interfere with the special provisions of an act, approved March fourth, eighteen hundred and eighty-two, entitled "An act to prevent the adulteration, and to regulate the sale of milk."

10. *And be it enacted*, That this act shall take effect immediately.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Sixth st, 807, br fac; cost, $11,000; o, Angelo Ghiglione; a, W. J. Fryer....150 Broadway and 71 and 73 Liberty st, n e cor, br office build; cost, $175,000; o, Williamsburgh City Fire Ins. Co.; a, F. C. Merry; b, R. L. Darragh & Co. and H. Williams and Cheney & Hewlett....111 Nassau st, br store; cost, $75,000; o, George G. Sickles, New Rochelle; a, E. Sniffin; b, Van Dolson & Arnott....82, 84, 86 and 88 Fulton st, 3 iron, br and stone stores; cost, $55,000, $20,000 and $25,000; o, trustees C. L. Wolfe; a, J. B. Snook; b, not selected....13 Roosevelt st, br ten; cost, $18,000; o, F. A. Conkling; a, B. McGurk; b, J. Fitzpatrick and W. Cooper....41 and 43 Bedford st, br and brown stone ten; cost, $25,000; o, Mrs. Mary McManus; a, M. Louis Ungrich; b, not selected....1 W 13th st, br fac and dwel; cost, $14,000; o, Francis W. Hurtt; a, W. H. Hume; b, not selected....312 and 314 E 22d st, br marble works; cost, $12,000; o, Daniel I. Bailie; a, Youngs & Campbell; b, not selected....418-426 W 48th st, five br and stone ten; cost, each, $15,000; o, Jahanna F. Fonthan; a, W. E. Bishop....402 and 404 E 15th st, two br stores and ten; cost, each, $7,500; o, Peter But-

(Continued on page 521.)

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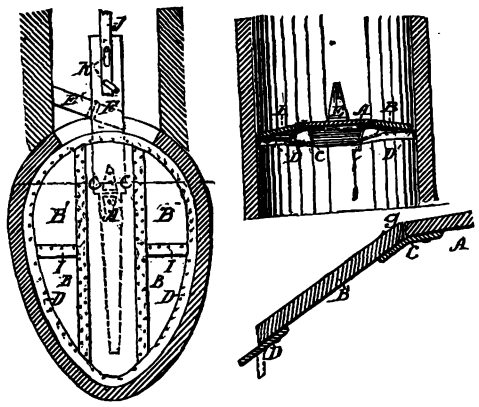
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

268,908. WING-GATE FOR FLUSHING SEWERS. SAMUEL JOHNSON, San Francisco, Cal. Filed June 5, 1882. (No model.) Issued Dec. 12, 1882.

Brief.—A brace bearing on the sewer-wall is hinged to a gate with beveled circumferential edge formed of a centre piece and wings (with the inner edges beveled to fit the centre piece at a certain angle) secured thereto by flexible strips. A circumferential flexible strip renders the gate water-tight, while an extension-bar on the centre piece may be wedged or braced against the sewer-wall.

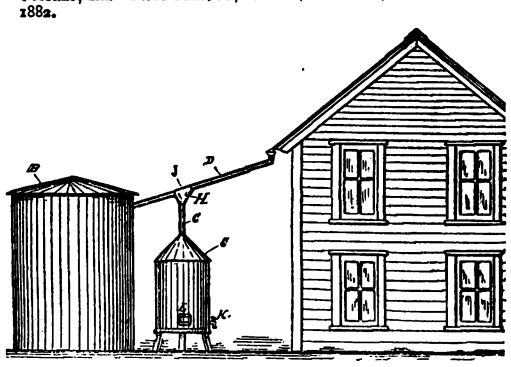


Claim.—1. A sewer-gate, A B, having the exterior edges curved and beveled, so as to fit the sides of the sewer when the gate stands at an angle, and provided with the flexible flaps D around the edges, and the inclined brace E, standing at an angle so as to brace against the side or bottom of the sewer and retain the angularly placed gate, substantially as herein described.

2. A sewer-gate consisting of the centre piece A, and the wings B, beveled to fit, and having their meeting-edges hinged together by flexible strips C, and their exterior edges provided with flexible flaps D, in combination with the hinged brace E and the standard or bar F, wedged or braced against the top of the sewer, substantially as and for the purpose herein described.

3. A sewer-gate consists of a vertical central piece, A, having a brace E, by which it may be fixed within the sewer, in combination with two or more wings, B or B, hinged to the central piece by flexible water-tight strips C, and having exterior projecting flaps, D, so that said gate may be folded for introduction or removal, and when opened will form a tight dam within the sewer, substantially as herein described.

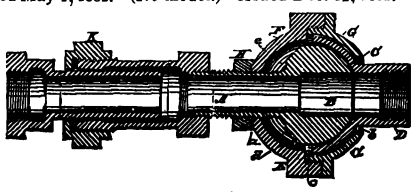
268,914. RAIN-WATER CUT OFF. GEORGE LEMLE, New Orleans, La. Filed Mar. 21, 1882. (No model.) Issued Dec. 12, 1882.



Claim.—1. In a rain-water cut off, in combination, the slanting conducting-pipe D, the cistern B, and the intermediate cut-off tank, C, so arranged under the pipe D that said tank C must be filled with water by said pipe D before the pipe can carry water into the cistern, as shown and described.

2. In a rain-water cut-off, in combination, the cistern B, the cut-off, tank C, and the slanting conducting-pipe D, provided with an enlargement or offset H, as shown and described.

268,917. PIPE-COUPLING. WILLIAM MARTIN, Tidioute, Pa., Filed May 1, 1882. (No model.) Issued Dec. 12, 1882.



Claim.—1. In a pipe-coupling, a pipe, A, provided with a ball, B, and a pipe D, provided with a hemispherical shell C, combined with an incasing shell and a nut H.

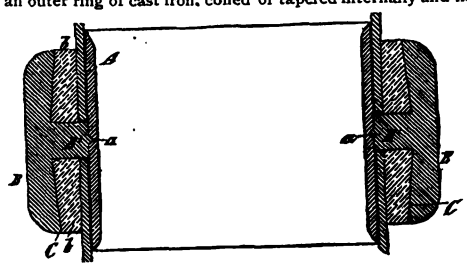
2. In a pipe-coupling, a screw-threaded pipe, A, having a ball, B, and a pipe, D, having a hemispherical shell, C, combined with a divided incasing shell, F G, and a nut H.

3. A pipe-coupling composed of the pipe A, provided with ball B, the pipe D, provided with a hemispherical shell C, and the divided incasing shell F G, the ball being beveled in the rear, whereby an oil-chamber is provided, substantially as set forth.

269,011. PIPE-COUPLING. THOMAS B. CLATWORTHY, New York, N. Y., assignor to Abendroth & Root Manufacturing Company, same place. Filed November 3, 1882. (No model.) Issued December 12, 1882.

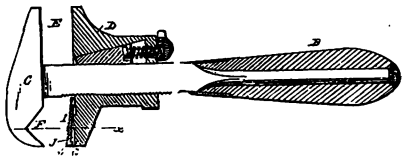
Claim.—1. The pipe coupling composed of an inner ring of wrought iron and an outer ring of cast iron, having an internal flange; which is secured by casting upon the inner ring, thereby forming two annular sockets for the reception of the pipe, substantially as described.

2. The pipe coupling composed of an inner ring of wrought iron and an outer ring of cast iron, coned or tapered internally and having



an internal flange, which is secured by casting upon the inner ring, thereby forming two annular dovetailed sockets for the reception of the pipe, substantially as described.

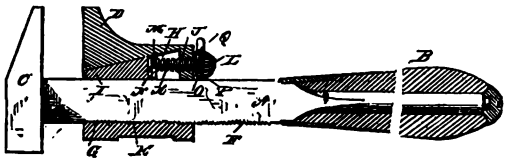
269,072. PIPE WRENCH. JOHN LEE, Mansfield, assignor to the Russell Wrench and Novelty Company, Russell, Ohio. Filed October 18, 1882. (No model.) Issued December 12, 1882.



Claim.—1. The combination, in a pipe-wrench, of the shank, the fixed jaw having an angular recess, the sliding jaw having a dovetailed lug at its outer end for a portion of its length, and the tooth wedge having a dovetailed recess extending from its outer toward its inner end, whereby it may be fitted to slide upon and beyond and yet be firmly retained upon the face of the sliding jaw, as set forth.

2. As an improvement in pipe-wrenches, the combination of the shank, the fixed jaw, the sliding jaw, and sliding wedges mounted upon the faces of the fixed and sliding jaws, and provided respectively with a curved or angular recess and with transverse teeth or ratchets, the said wedges being faced in opposite directions, as set forth.

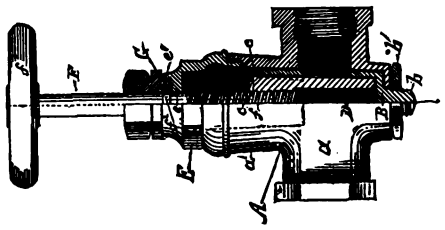
269,073. WRENCH. JOHN LEE, Mansfield, assignor to the Russell Wrench and Novelty Company, Russell, Ohio. Filed October 18, 1882. (No model). Issued December 12, 1882.



Claim.—1. In a wrench, the combination, with the stem or shank having a fixed jaw, of the sliding jaw D, having beveled recess H, and screw K, provided with handle L and annular groove M, and the wedge I, having claws N, as and for the purpose set forth.

2. In a wrench, the combination, with the sliding jaw D, having beveled recess H, of the wedge I, having claws N, the screw K, having annular groove M and handle L, provided with thumb piece Q and recess P, and the spring O, as and for the purpose set forth.

269,111. GLOBE-VALVE. GEORGE REIMANN, Quincy, Ill. Filed May 4, 1882. (No model.) Issued December 12, 1882.



Claim.—The cock described, having the shell or casing A, with the horizontal and vertical portions, as described, the thimble B, the guide ring C, plug D, cap E and screw stem F, all combined and arranged as and for the purpose described.

268,655. OIL-LAMP STOVE. GEORGE H. FERRIS, Brooklyn, N. Y. Filed Nov. 16, 1877. Issued Dec. 5, 1882.

268,661.—UNDERGROUND TELEGRAPH. LEVI HAAS, Chester, Pa. Filed July 3, 1882. (No model.) Issued Dec. 5, 1882.

268,675. DOUBLE ACTING PUMP. JAMES W. HILLIKER, St. John's, Mich. Filed Mar. 15, 1882. (No model.) Issued Dec. 5, 1882.

268,676. STEAM-PUMP. WILLIAM HOPKINS, Dubuque, Iowa. Filed May 9, 1882. (No model.) Issued Dec. 5, 1882.

268,682. SMOKE-CONSUMING FURNAGE. PETER H. JACKSON, San Francisco, Cal. Filed June 29, 1882. (No model.) Issued Dec. 5, 1882.

268,686. MEANS FOR FASTENING HYDRANT TOPS, ETC. WILLIAM KAISER, Wilkes-Barre, Pa. Filed Apr. 6, 1882. (No model.) Issued Dec. 5, 1882.

268,718. HEATING-STOVE. JOHN B. OLDERSHAW, Baltimore, MD. Filed Aug. 14, 1882. (No model.) Issued Dec. 5, 1882.

268,727. HYDROCARBON-ENGINE. WATSON F. QUINBY, Wilmington, Del. Filed Apr. 20, 1882. (No model.) Issued Dec. 5, 1882.

268,750. GARBAGE RECEPTACLE. DAVID D. TOAL, New York, N. Y. Filed Sept. 20, 1882. (No model.) Issued Dec. 5, 1882.

268,751. HOT-AIR FURNACE. JOSEPH TRAVIS, Philadelphia, Pa. Filed Apr. 28, 1882. (No model.) Issued Dec. 5, 1882.

268,770. CHIMNEY-FLUE. CHARLES BUEK, New York, assignor to G. W. Rader & Co., same place. Filed Sept. 22, 1882. (No model.) Issued Dec. 5, 1882.

268,777.—VAPOR-BURNER. JAMES R. BAKER, Kendalville, Ind. Filed June 30, 1882. (No model.) Issued December 12, 1882.

268,784. WRENCH. BERNARD DONOHUE, Yonkers, N. Y. Filed April 14, 1882. (No model.) Issued Dec. 12, 1882.

268,792. RACHET-WRENCH. JOHN B. HALBERT, Maitland Fla. Filed Aug. 1. 1882. (No model.) Issued Dec. 12, 1882.

268,816. ROTARY DIFFERENTIAL FORCE-PUMP. PETER MUNZINGER, Phila delphia, Pa. Filed Jan. 23, 1882. (No model.) Issued Dec. 12, 1882.

268,824. HYDROCARBON-BURNER. RANSOM F. RANKIN, Columbus, Ohio. Filed April 29, 1882. (No model.) Issued December 12, 1882.

268,832. PUMP. WILLIAM SELLERS, Philadelphia, Pa. Filed Feb. 27, 1882. (No model.) Issued Dec. 12, 1882.

268,833. STOVE. JOHN SINNAMON, Oswego, N. Y. Filed Sept. 7, 1882. (No model.) Issued Dec. 12, 1882.

268,842. PUMP. BENAJAMIN C. VANDUZEN, Cincinnati, Ohio, assignor to Herbert D. Lafferty, Nashville, Tenn., and Stanley B. Lafferty, Davcnport, Iowa. Filed May 26, 1882. (No model.) Issued Dec. 12, 1882.

268,843. PUMP. BENJAMIN C. VANDUZEN, Cincinnati, Ohio, assignor to Herbert B. Lafferty, Nashville, Tenn., and Stanley B. Lafferty, Davenport, Iowa. Filed May 26, 1882. (No model.) Issued Dec. 12, 1882.

268,844. PUMP. BENJAMIN C. VANDUZEN, Cincinnati, Ohio, assignor to Herbert D. Lafferty, Nashville, Tenn., and Stanley B. Lafferty, Davenport, Iowa. Filed May 26, 1882. (No model.) Issued Dec. 12, 1882.

268,845. PUMP. BENJAMIN C. VANDUZEN, Cincinnati, Ohio, assignor to Herbert D. Lafferty, Nashville, Tenn., and Stanley B. Lafferty, Davenport, Iowa. Filed April 29, 1882. (No model.) Issued Dec. 12, 1882.

268,857. RANGE. CHARLES H. BLANCHARD, Batavia, Ohio. Filed June 16, 1882. (No model.) Issued Dec. 12, 1882.

268,860. CHIMNEY. JEREMIAH BROWELL, San Francisco, Cal. Filed March 7, 1882. (No model.) Issued Dec. 12, 1882.

268,863. PROCESS OF AND APPARATUS FOR GENERATING GAS. WILLIAM FRANK BROWN, New York, N. Y. Filed June 30, 1881. (No model.) Issued Dec. 12, 1882.

268,871. VAPOR-STOVE. RODERICK F. DANFORTH, Washington, D. C. Filed May 9, 1882. (No model.) Issued Dec. 12, 1882.

268,881. EAVES-TROUGH. CHARLES R. EVERSON, Macedon, N. Y. Filed June 2, 1882. (No model.) Issued Dec. 12, 1882.

268,889. FURNACE-DOOR. HARRIS HIGGINS, Chicago, Ill. Filed Oct. 13, 1882. (No model.) Issued Dec. 12, 1882.

268,910. CARBURETOR. AUGUSTUS W. LACY, Attleborough, Mass. Filed July 21, 1882. (No model.) Issued Dec. 12, 1882.

268,918. ADJUSTABLE TUBE-EXPANDER. NEIL G. MCINTYRE, Brooklyn, N. Y., assignor of seven-eighths to Warren W. Sheppard, Jessie McIntyre, Catharina Herbst, and Robina R. Hedges, all of same place. Filed Mar. 27, 1882. (No model.) Issued Dec. 12, 1882.

268,921. COOKING AND HEATING STOVE. FRANK METZNER, Chicago, Ill. Filed Sept. 11, 1882. (No model.) Issued Dec. 12, 1882.

268,923 STEAM-BOILER. GEORGE MILES, Wellesley Hills, Mass. Filed Mar. 4, 1882. (No model.) Issued Dec. 12, 1882.

268,929. GAS-METER. PEDRO ENRIQUE PEREZ, Valparaiso, Chili. Filed June 21, 1882. (Model.) Issued Dec. 12, 1882.

268,933. APPARATUS FOR VAPOR BATHS. ERASTUS POND, Portsmouth, Ohio. Filed Sept. 26, 1882. (No model.) Issued Dec. 12, 1882.

268,935. COOKING ATTACHMENT FOR OIL-STOVES. MARION E. PORTER. Leon, Iowa. Filed Sept. 20, 1882. (No model.) Issued Dec. 12, 1882.

268,956. DYNAMO-ELECTRIC MACHINE. ELMER A SPERRY, Courtland, N. Y. Filed Apr. 28, 1881. (No model.) Issued Dec. 12, 1882.

268,971. WATER-FILTER. PHILLIPS ABBOTT, Brooklyn, N Y. Filed Jan. 10, 1882. (No model.) Issued Dec. 12, 1882.

268,980. ARMATURE FOR DANAMO-ELECTRIC MACHINES. FOREE BAIN, Union City, Ind., assignor to the Fisher Electric Company, same place. Filed July 26, 1882. (No model.) Issued December 12, 1882.

268,984. FORCE PUMP. JOHN BEDFORD, Rossville, Tenn. Filed April 14, 1882. (No model.) Issued December 12, 1882.

268,999. EXTENSION GAS FIXTURE. JOHN F. BROWN, Brooklyn, assignor to Charles F. Oxley and Silas M. Giddings, New York, N. Y. Filed June 14, 1882. (No model.) Issued December 12, 1882.

269,022. APPLIANCE FOR GALVANIZING. HENRY CULL, Johnstown, Pa. Filed September 14, 1881. (No model.) Issued December 12, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING APRIL 21st, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough.
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	15	22.6	2	13.3			3		1						2	1						1
Boston.....Mass	407,581	199	25.4	60	30.1	7	1	29	5	6	7		2		5	24		18	2	6	2		1
Cambridge.....Mass	57,432	21	19.0	4	19.0			3			1					5							
*Worcester.....Mass																							
New Haven.....Conn	66,979	20	15.5	5	25.0	1		2						1		2	1	2			1		1
Providence.....R. I.	116,755	57	25.4	8	14.0			11					7			7		4					
Total	683,266	312	23.7	79	25.3	8	1	48	5	7	8		9	1	5	40	2	24	2	6	3		2
EASTERN CITIES.																							
Albany.....New York	98,430	58	30.6	17	29.3	2	2	12	1				1		3	4	1	1	1		1		
New York.....New York	1,299,249	676	27.0	258	38.1	24	3	106	11	12	26	5	7	12	22	100		44		27	10		3
*Brooklyn.....New York																							
*Hudson Co.....New Jersey																							
Newark.....New Jersey	147,744	85	29.9	32	37.6	1	2	17		3	3		2	1	9	11		6			1		
Camden.....New Jersey	54,012	12	11.5	7	58.3								1			3		2					
Paterson.....New Jersey	58,324	24	21.4	6	25.0	1		5							1	3		1				1	1
Philadelphia.....Pa.	907,043	387	22.1	134	34.6	6		54	12		15		6	1	10	46	6	6				2	
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	25	27.7	6	24.0			2					1			2						6	
Total	2,611,691	1,267	25.2	460	36.2	34	7	196	24	15	44	5	18	14	45	169	7	60	1	27	12	9	4
LAKE CITIES.																							
Buffalo.....New York	168,702	87	26.8	36	41.3	2	2	7			4		1	1	8	8		8		1	5		
Rochester.....New York	92,116	37	20.8	11	29.7	2	2	5			1	1	1			2		2					
*Syracuse.....New York																							
*Cleveland.....Ohio																							
Detroit.....Michigan	131,118	60	23.8	34	56.6			10	2	1	7		1		4	4		6		1			
*Chicago.....Illinois																							
Milwaukee.....Wisconsin	135,233	47	18.0	23	48.9	2	3	4	1		2				1	4		2	1		2		1
Total	527,169	231	22.8	104	45.0	6	7	26	3	1	14	1	3	1	13	18		18	1	2	7		1
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	59	16.0	24	40.6	3	1	7	2		6				2	8	1	1					5
Cincinnati.....Ohio	267,767	120	23.4	53	44.1	2		14	1			1	2		5	17		9		1	1		5
Dayton.....Ohio	41,648	16	20.0	5	31.2	1	1	4							1								
Louisville.....Ky.	131,529	63	24.9	20	31.7	2	1	13						1		11						11	1
Indianapolis.....Indiana	86,529	36	21.6	16	44.4	1	1	4	1					1	1	1	2		1				
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	26	13.8	9	34.6	1	3	3								6		1			1	1	
*St. Paul.....Minn																							
*St. Louis.....Mo.																							
Total	817,022	320	20.8	127	39.6	10	7	45	4		6	1	2	2	9	43	3	11	1	1	2	12	11
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.....Wh.	126,471	48	18.3	11	22.9			7	1	1	1	1	1		4	5		1		1	1		1
" " .....Col.	71,103	27	19.7	16	59.2			7	1	1						5		2		1			
Richmond, ...Va. Wh.	38,526	11	14.8	5	45.4	1		2								1							1
" .....Col.	29,394	16	28.3	1	6.2		1	3			1					1	1						
Charleston .....S. C. Wh.	22,699	11	25.2	1	9.0								1	2		1	1						
" .....Col.	27,595	22	41.5	4	18.1			5		1								1			2		
*Atlanta.....Ga. Wh.																							
" .....Col.																							
*Savannah.....Ga. Wh.																							
" .....Col.																							
Nashville.....Tenn. Wh.	31,993	7	11.3	4	57.1										2						1		1
" .....Col.	19,406	11	29.7	6	54.5			2		1											1	2	3
Memphis .....Tenn. Wh.	18,677	8	22.2	1	12.5		1						1			2	1						
" .....Col.	14,896	9	31.4	2	22.2			4								1					1		
*Mobile.....Ala. Wh.																							
" .....Col.																							
New Orleans.....La. Wh.	163,757	81	25.7	22	27.1	9		5		5	1			1	1	3		1				18	
" " .....Col.	59,866	72	62.5	24	33.3	2		5		4				1	2	5		2				28	
Total White	412,123	166	20.9	44	26.5	9	1	14	1	6	2	1	3	3	7	12	2	2		1	2	18	3
Total Colored	222,260	157	36.7	53	33.7	3	1	26	1	7	1			1	2	12	1	5		1	4	30	3
Total in 28 U. S. Cities	5,273,531	2,453	24.2	867	35.3	70	24	355	38	36	75	8	35	22	81	294	15	120	5	38	30	69	24
April 7—Total in 28 English Cities	8,620,975	4,309	26.1			128				31	24		52		55					87		2	112
April 7, " 8 Scotch Cities	1,233,088	697	29.4			11				13	15		12		8			157		27			48
April 7, " 16 Irish Cities	854,731	581	35.3			6		75		10	1		7		6			175		6			20

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an urban population of 5,273,531, there died during the week ending April 21, 2,453 persons, which is equivalent to an annual death rate of 24.2 per 1,000. A slight increase over the preceding week, for which it was 24.

For the North Atlantic cities the rate was 23.7; for the Eastern cities 25.2; for the lake cities 22.8; for the river cities 20.3; and in the Southern cities, for the whites, 20.9; and for the colored, 37.7 per 1,000.

Of the whole number of deaths 35.3 per cent. were under five years of age. Accidents caused 2.8 per cent. of all deaths, the proportion rising to 5.4 per cent. among the Southern whites.

Consumption caused 14.4 per cent of all deaths. In the North Atlantic cities it caused 15.3; in the Eastern cities, 15.4; in the lake cities, 11.2; in the river cities, 14.0; and in the Southern cities, for the whites 8.4, and for the colored, 10.1 per cent.

Croup caused 1.5, diarrhœal diseases 1.4, and diphtheria 3.1 per cent. of all deaths. In the North Atlantic cities diphtheria caused 2.5; in the Eastern cities, 3.4; in the lake cities, 6.0; in the river cities, 1.8; and in Southern cities, 1.2 among the whites, and .6 per cent. among the blacks. Typhoid fever caused 1.4 per cent. of all deaths. In the North Atlantic cities it caused 2.8; in the Eastern cities, 1.4; in the lake cities, 1.2; in the river cities, .6; and in the Southern cities among the whites, 1.8 per cent. Scarlet fever caused 3.3 per cent. of all deaths. The proportion rising to 5.6 per cent. in the lake cities. Pneumonia caused 11.9 per cent. of all deaths, the highest ratio being in the Eastern cities, where it caused 13.3, and the lowest in the Southerin cities, where it was for whites 7.2, and for colored 7.6 per cent. Measles caused 1.5; puerperal diseases, 1.1; small-pox, 2.8, and whooping cough .9 per cent. The high rate of small-pox is due to its prevalence in New Orleans, where it caused 22.2 per cent. of all the deaths among the whites, and 38.8 of all deaths among the colored.

BOSTON, MASS.—C. E. Davis, Jr., Clerk, reports 14 cases of diphtheria, 20 of scarlet fever, six of typhoid, and one of small-pox.

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BUFFALO, N. Y.—Dr. Phelps reports seven cases of small-pox in the city.

PATERSON, N. J.—Dr. Wm. K. Newton reports a case of small-pox imported from Philadelphia, Pa.

DISTRICT OF COLUMBIA.—Health Officer Townshend reports one case of small-pox.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 24 new cases of scarlet fever, and 12 of diphtheria. Including these, there are now under treatment 62 cases of the former disease, and 24 of the latter.

DETROIT, MICH.—Dr. O. W. Wight reports seven new cases of scarlet fever, and 21 of diphtheria.

PITTSBURGH, PA.—Dr. Wm. Snively reports two cases of small-pox.

DAYTON, O.—Dr. E. B. Davis reports two cases of small-pox.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths, two of which were in persons under five years of age. One of the deaths was caused by measles.

PROVIDENCE, R. I.—Dr. E. M. Snow reports that "although the number of deaths during the week was considerably above the annual weekly average, there was a remarkable decrease in the number from zymotic causes. The new cases of typhoid fever and pneumonia are rapidly decreasing, and it is probable that, as the weather grows warmer, the mortality from these two diseases will nearly, though not entirely, cease."

BOSTON, MASS.—The Board of Health has ordered that cases of death from small-pox, diphtheria, scarlet fever, typhoid or typhus fevers, must be immediately wrapped in a sheet saturated with a ten per cent. solution of chloride of zinc, and placed in a coffin which must be made absolutely tight, and which must not be re-opened.

BALTIMORE, MD.—The Board of Health gives the following as the annual rates estimated on the mortality for the week ending April 21: Whole population, 19.65; white, 16.09; colored, 40.73. The total number of deaths was 155; of these 77 were of males, and 78 of females; 58 of persons under five years, and 24 of persons over 60 years of age. Accidents caused two deaths, consumption 26, croup two, diarrhœal diseases one, diphtheria 12, erysipelas two, malarial fevers three, scarlet fever six, pneumonia 20, congestion of lungs three, bronchitis two, measles one, and small-pox six.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELLS ISLAND.—Dr. T. M. Franklin, reports 1,360 insane persons remaining under treatment April 21. The changes reported during the week are, admissions 14, discharges two, and deaths one.

RAVENNA, OHIO.—Postmaster W. S. Krake, reports the sanitary condition of the district as good, although a mild type of scarlet fever is prevailing.

MICHIGAN.—The report of Dr. H. B. Baker, Secretary State Board of Health, shows the prevalent diseases during the week ending April 14, to have been bronchitis, neuralgia, rheumatism, intermittent fever, tonsilitis, pneumonia, and consumption. Pneumonia and whooping cough increased while measles decreased in area of prevalence during the week. Diphtheria was reported present at nine places, scarlet fever at 18 places and measles at 23 places. One case of measles came with immigrants arriving at Port Huron April 12.

NEW ORLEANS, LA.—The Board of Health reports for the week ending April 14, shows 175 deaths; white 89, colored 86; equivalent to an annual rate of 41.05 for the total population, of 28.28 for the white, and of 74.59 for the colored.

White.—Deaths under five years 13; over 60 years nine. Small-pox caused 32 of the 89 deaths, malarial fevers five, diarrhœal diseases five, consumption 11, pneumonia four, gangrene of the lungs one, and violence two.

Colored.—Deaths under five years 26; over 60 years seven. Small-pox caused 45 of the 86 deaths, typhoid fever one, malarial fever one, diphtheria one, consumption seven, bronchitis one, and pneumonia four.

CALIFORNIA.—The monthly circular of the State Board of Health (F.W. Hatch, M.D., Secretary) for March gives statistics from twenty localities, not including San Francisco. The deaths reported numbered 181, which is equal to an annual rate of 14.04. There is a very general exemption from zymotic diseases, although whooping cough is said to be somewhat prevalent at Sacramento, Modesto and Los Angeles, measles at Williams, and varicella and mumps at College City. Small-pox is localized at Nevada and Napa cities, and it is thought that the prompt and energetic measures adopted in these cities have effectually arrested its progress. These measures have been vaccination, isolation, and attention to cleanliness.

ONTARIO, CANADA.—During the week ending April 14, influenza has decreased, while intermittents have made a decided advance. Both of these changes are attributed by the *Provincial Bulletin* to the milder weather recently experienced. The retrogression of measles, noticed last week, has continued, but the disease still forms as much as 5.6 per cent. of the total cases of sickness reported. On account of an increase in the area of prevalence of diarrhœa the *Bulletin* urges the prompt removal of all deposits of organic materials which may have accumulated during the winter.

NEW HAVEN, CONN.—The annual report of the Board of Health, for the year 1882, shows a mortality of 1,343 exclusive of still-births, of which there were 70. Estimating the average population at 72,000, which is said to be an under rather than an over-estimate, the death rate per 1,000 is 18.65. The death rate for 1881 was 19.1, and average rate of the past fifteen years 19.06. The births numbered 2,088, but a complete registration of the births has not been secured. Of the decedents, 1,294 were white and 49 colored persons; 461 were under five years of age, and 283 were over 60 years.

Measles caused 10 deaths, scarlet fever 11, diphtheria and croup 60, whooping cough 17, erysipelas two, diarrhœal diseases 130, of which 99 are recorded as infantile diarrhœa, cerebro-spinal meningitis three, typhoid fever 24, malarial fevers 38, consumption 203, bronchitis 32, pneumonia and congestion of lungs 99, puerperal fever nine, and violence 64. No death occurred from small-pox during the year, and only two fatal cases of this disease have been recorded since 1876.

"There are, as has been ascertained by actual count, more than 1,100 pupils now in our public schools not protected *at all* by vaccination, and nearly 1,000 more over 12 years who have not been vaccinated in five years. Therefore it is reasonable to believe that there is also an element of good luck in the long-continued exemption of our citizens from this disease, while there are so many among us liable to its contagion, and while we are so peculiarly exposed."—*Dr. C. A Lindsley, Health Officer.*

HAVANA, CUBA.—During the month of March there were 662 deaths in the city, 23 of which were caused by yellow fever, 10 by typhoid fever, 10 by malarial fever, one by diphtheria, six by croup, one by scarlet fever and nine by measles. Measles is stated by Dr. D. M. Burgess, in his report, as prevailing extensively and being of unusual malignancy. "The weather has been excessively hot for the past eight days, and as quite a number of fresh troops are arriving by the Spanish mail steamers, the prospects are that these will become victims of yellow fever shortly."

Later advices, dated April 21, report 12 deaths by yellow fever in the city during the week which ended on the 20th inst. These deaths occurred in the military hospital. There are no cases of yellow fever among the merchant shipping. For the past week the weather has been pleasantly cool and it is difficult from any available data to prognosticate with regard to the epidemicity of the fever during the coming summer.

ENGLAND.—During the week which ended April 7, the annual rate of mortality in the 28 great towns averaged 26.1 per 1,000 of their population. Salford gave the smallest rate, 18.1, and Manchester the largest, 35.7. In Huddersfield and Norwich no deaths were registered from any of the principal zymotic diseases. The 24 deaths from diphtheria in the 28 towns included 20 in London. Small-pox caused one death in London and one in Newcastle-on-Tyne, but not one in any of the twenty-six other towns.

London.—Births 2,928; deaths 1,940. The births exceeded by 147 and the deaths by 131 the average numbers in the corresponding weeks of the last ten years. The annual rate was 25.6. Small-pox caused one death. Seven new cases of small-pox were admitted to the hospitals during the week, making the number remaining under treatment at its close 82. Measles caused 51 deaths, scarlet fever 15, diphtheria 20, whooping cough 42, typhus three, typhoid fever 13, diarrhœa and dysentery nine, and violence 58.

PARIS, FRANCE.—There were 1,312 deaths during the week which ended April 5: males 697, females 615; under five years 364, over 60 years 321; annual rate 30.44. Typhoid fever caused 27 deaths, small-pox nine, measles 31, scarlet fever one, whooping cough 11, diphtheria and croup 44, erysipelas five, puerperal infection three, consumption 250, acute bronchitis 57, pneumonia 145 and violence 39.

There remained under treatment in the hospitals on April 1, 102 cases of small-pox, 242 of typhoid fever and 36 of diphtheria.

RHEIMS, FRANCE.—Consul John L. Frisbie's report for the week ending March 31, shows the occurrence of 68 deaths; under five years 23, over 60 years 16. Annual rate 37.68. No death was reported from small-pox, scarlet fever, measles, whooping cough, erysipelas or puerperal infection. Croup and diphtheria caused two deaths; typhoid fever three, bronchitis 13, pneumonia four, consumption 10, diarrhœal diseases five and violence four.

SCOTLAND.—During the week ending April 7, the death rate in the eight principal towns was 29.4 or 7.3 above that of the corresponding week of last year. The lowest rate was recorded in Paisley, 17.2, and the highest in Glasgow, 32.9. Whooping cough continues to be the most fatal epidemic; 19 deaths from this disease were registered in Glasgow and 14 in Dundee. Of 27 deaths from measles which occurred in the eight towns, 24 took place in Glasgow.

Edinburgh.—Total deaths 119; rate 26.2. Small-pox none, measles and scarlet fever one each, typhoid fever and diarrhœal diseases two each, diphtheria five, whooping cough four, and acute lung diseases 26.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the registrar-general for the week ending April 7, for a summary of which see table in this issue.

Dublin.—Total deaths 263; rate 39.1. No death is registered from small-pox, measles or diphtheria. Scarlet fever caused one death, typhus seven, typhoid fever four, whooping cough 12, diarrhœa two, consumption 34, acute lung diseases 70 and violence four.

Belfast.—Total deaths 120; rate 29.2. No death is registered from small-pox, measles or typhus. Scarlet fever caused five deaths, whooping cough six, diphtheria, typhoid fever and violence one each, diarrhœal diseases four, consumption 20 and acute lung diseases 38.

COPENHAGEN, DENMARK.—During the week which ended March 27, there were 148 deaths recorded; under five years, 59; over 60 years, 35; annual rate 24.76. No death was registered from small-pox, measles, erysipelas or puerperal fever. Scarlet fever caused three deaths, diphtheria two, croup one, whooping cough four, typhoid fever four, diarrhœa six, consumption 24, pneumonia nine, pleurisy one, capillary bronchitis 10 and violence one.

During the same week there were reported 17 cases of scarlet fever, four of diphtheria, five of croup, 45 of whooping cough, three of typhoid fever, 83 of diarrhœa, 19 of erysipelas, one of puerperal fever, 368 of bronchial catarrh, 11 of influenza, 58 of pneumonia and 131 of tonsilitis. No cases of small-pox or measles were reported.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 77 deaths for the week ending March 24; males 40, females 37; under five years 34, over 60 years 15. Annual rate 23.0 per 1,000. Measles caused two deaths, scarlet fever four, croup and diphtheria two, whooping cough three, typhus and puerperal fever one each, typhoid fever two, diarrhœa five, consumption 11, pneumonia eight, bronchitis seven and violence one.

The cases reported during the week which ended March 31 were: small-pox one, measles 20, scarlet fever 14, whooping cough five, erysipelas four, diphtheria 15, typhoid fever two, diarrhœa 12, tonsilitis 10, pneumonia 12, pleurisy three and bronchitis 71.

BRUSSELS, BELGIUM.—During the week ending [illegible] curred 276 births and 238 deaths in the city and its [illegible] figures are equal to the respective annual rates of [illegible] 1,000. The deaths of children under five years numbered [illegible] death was recorded from scarlet fever, whooping cough [illegible] diphtheria. Small-pox caused two deaths, measles five, typhoid [illegible] two, diarrhœal diseases 18, bronchitis and pneumonia [illegible] sumption 39.

ROTTERDAM, NETHERLANDS.—The report of Consul Jno. [illegible] ters, for the week ending April 7, shows the continuance of [illegible] infection at that port. Seven deaths were recorded from [illegible] during the week and 26 new cases were reported.

VIENNA, AUSTRIA.—Consul-General Jas. R. Weaver's report [illegible] week ending March 24 shows 447 deaths, equal to an annual rate of 31.0. Of the deaths 112 were due to consumption, 79 to acute [illegible] diseases, one to small-pox, two to scarlet fever, five to diphtheria, seven to whooping cough and one to typhoid fever. The deaths of children under five years numbered 166.

BARCELONA, SPAIN.—Consul Fred. H. Schench reports that there were 38 deaths from small-pox during the week ending March [illegible] total mortality of 251; population 251,000.

CALCUTTA, INDIA.—Consul-General Mattson's report for the week ending Jan. 27 shows 299 deaths giving a ratio of 36.0 as compared with 42.1 during the previous week. The general death rate is somewhat above the average; the cholera rate is lowered but still remains above the mean of past years. Of the 299 deaths cholera caused [illegible] fevers 91, bowel complaint 45, tetanus 21, consumption 10 and accidents seven.

During the following week (ending Feb. 3) the deaths numbered 281, giving a rate of 33.8. Cholera is reported as waning but still the death rate from this cause is higher than usual. Of the 281 deaths cholera caused 27, fevers 90, bowel complaints 46, tetanus [illegible] consumption 11 and violence two.

The report for the month of December shows that 1,596 deaths were registered against 1,244 in the preceding month, giving a rate of [illegible] against 34.4. The total exceeds the decennial means by 83, the excess being chiefly due to the increase of deaths from cholera. Although this disease prevailed with unusual severity in the northern sections of the town its incidence was sporadic. It caused 411 deaths against [illegible] in the preceding month. The births registered during the month numbered 683.

The report for the fourth quarter of the year 1882 shows 3,991 deaths while the means of the corresponding quarters of the preceding decade was 4,003. Fevers caused 312 deaths, mean of decade 415; cholera 734, mean 361; dysentery and diarrhœa 503, mean 544; small-pox two, mean 13. Nine of the deaths from fever were registered under the term typhoid. In no fourth quarter of the preceding decade has the cholera mortality been so large as in 1882. A similar excess of cholera mortality occurred in the districts around Calcutta.

MADRAS, INDIA.—During the week ending Feb. 23, 262 deaths were registered; males 135, females 127; rate of mortality 34.2 per mille. per annum. Small-pox caused 14 of the deaths, measles seven, fevers 61, dysentery 22, and diarrhœa 20. No death was registered as from cholera.

BOMBAY, INDIA.—Consul B. F. Farnham reports 556 deaths for the week ending Feb. 20, being 48 more than the mean of the corresponding periods in the preceding five years. Annual rate 34.88. There were 87 deaths from remittent fever, 83 from diseases of the respiratory system, 23 from diarrhœa, and 17 from dysentery. The deaths from small-pox during the week were 94, being six more than during the preceding week. There has been no death from this cause among Europeans yet. The number of deaths has gone on increasing from week to week since the epidemic declared itself, but the advance is not nearly so marked this week.

MADRAS, INDIA.—During the week ending Feb. 16 there were 276 deaths registered; males 157, females 119; annual rate 36.1. Small-pox caused 18 of the deaths, measles two, fevers 76, dysentery 21, and diarrhœa 17. No death was registered as having been caused by cholera.

COLOMBO, CEYLON.—Small-pox continues fatal. During the two weeks ending Feb. 17 there were 16 deaths from this disease.

SIDNEY, NEW SOUTH WALES.—Vice-Consul F. H. Boyd transmits the return of the registrar general for the month of December. The births numbered 775 and the deaths 514. In the city 229 death occurred; males 124, females 105; under five years, 100; population 103,379. In the suburbs 285 deaths were registered; males 164, females 121; under five years 177; population 120.832 Diarrhœal diseases continue to be fatal, there having been 23 deaths occasioned by them in the city, and 47 in the suburbs.

BRISBANE, NEW SOUTH WALES.—There were 109 deaths registered during the month of December in the city and suburbs; males 64, females 45; under five years, 69; population 33.068. Of the 109 deaths, zymotic diseases caused 46, but the return does not particularize the diseases.

NEW ZEALAND.—The Registrar-General's return for the month of January shows the occurrence of 251 deaths in 16 towns, giving an annual mortality rate varying from 10.56 in Wanganui to 18.78 in Napier. The births during this period numbered 525. Dysentery was the most fatal of the zymotic diseases.

MELBOURNE, AUSTRALIA.—The births registered in December numbered 712, viz., 350 boys and 362 girls. This total is slightly below the average of the past eight years. The deaths numbered 581 or 75 above the average of December during the past ten years; males 321, females 260. Children under five years constituted 48 per cent. of the total. The deaths of 20 persons who had attained the age of 75 years, or upwards, are recorded. Measles, scarlet fever, diphtheria, croup and whooping cough, each caused one death, typhoid fever 11, erysipelas five, dysentery 13, diarrhœa 92, cholera three, consumption 50, bronchitis eight, pleurisy three, pneumonia 14, congestion of lungs three, and violence 26.

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BOARD OF HEALTH NOTES.

NEW YORK.—Ten violations of the plumbing regulations were reported to the Health Department of this city during the week ending April 21, by the following inspectors: Messrs. Hooper and Hollick, three each; Messrs. Golden, Eagleson, Hicinbothem and Dickinson, one each. One of the cases reported by Inspector Hollick was of a very serious character, as follows: In the house on the north side of 75th street, 100 feet west of First avenue, (numbered 341), owned by Chas. Buddensick (or Budinsick), the house drain was not laid; the house was partially occupied, and the soil pipe was discharging all soil and waste into the cellar, while the leader discharged into the yard and area. Two violations of light and ventilation plans were reported during the same week.

During the week ending April 28, fifteen plumbing violations were reported, as follows: By Inspector Dickinson, six; by Elliot, four; by Hooper, three, and by Hollick, two. Most of the cases were not very serious. The worst was that of one sewer connection for five houses (on the south side of 97th street, 100 feet east of Third avenue, owned by Samuel Simmons) reported by Inspector Hollick. Ten cases were referred to the attorney during the week. There were no violations of light and ventilation plans.

A case of typhus fever was reported from Bellevue Hospital on April 20 and transferred to the Reception Hospital and thence to Riverside. The case came from the rear house, No. 747 Sixth street. On an immediate examination of this place, the physician of the Health Department found a young woman very sick of the same disease; and that in a family living just across the hall from her, four children had recently been sick with a disease having every symptom, as reported, of typhus, but were now well. From these previous cases, which had not been reported to the Health Department, though visited by a dispensary physician, the two existing cases are supposed to have sprung. The second case was also removed at once to Riverside Hospital.

During last week there was considerable excitement about an outbreak of typhus fever at St. Stephen's Home for children on East 28th street. The facts regarding it are, briefly, as follows: On Saturday, April 21, ten girls between the ages of five and nine were sent from the Home to Bellevue. Their disease was there pronounced scarlatina and the Health Department notified to remove them to the contagious diseases hospital. They were transferred to the Reception Hospital on Monday, the 23d, where the physician of Riverside Hospital visited them and pronounced all the cases typhus. The Home was at once quarantined, and daily inspection made for additional cases. On the 24th, six more were found there, and one that had been removed to the child's home; on the 25th, one; on the 26th, two, and on the 30th, one. All have been removed to Riverside; none have died or are dangerously sick. It is the opinion of the sanitary superintendent that the disease did not originate in, but was brought to the Home.

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Blank forms and specifications can be had on application to this office.

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PROPOSALS FOR LABOR AND MATERIALS AT TOLEDO, OHIO.

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., *April* 25, 1883.

Sealed proposals will be received at this office until 12 m., on the 16th day of May, 1883, for all the labor and materials, bricks and mortar and setting stone required to complete the Custom House, etc., at *Toledo, Ohio*, in accordance with drawings and specifications, copies of which, and any additional information, may be had on application at this office or the office of the Superintendent.

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PROPOSALS FOR FUEL, FORAGE AND STRAW.

DEPOT QUARTERMASTER'S OFFICE, HOUSTON ST., COR. GREENE, NEW YORK CITY, *May* 1, 1883.

Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, until 12 o'clock, noon, on the 31st day of May, 1883, at which time and place they will be opened in presence of bidders, for furnishing and delivering Fuel, Forage and Straw required at *New York City, Willet's Point, N. Y. H.*, and *David's Island, N. Y. H.*, during the fiscal year ending June 30, 1884.

The Government reserves the right to reject any or all proposals, or to accept as may be most advantageous to the Department.

A preference will be given to articles of domestic production, conditions of price and quality being equal, and such preference will be given to articles of American production produced on the Pacific coast to the extent of the consumption required by the public service there.

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Envelopes containing proposals should be marked:—"Proposals for Fuel, Forage and Straw," and be addressed to the undersigned.

HENRY C. HODGES, *Lt.-Col. and D. Q. M Gen'l, U. S. A.*

NOTICE TO CONTRACTORS.

The Board of Commissioners of Porter County, Indiana, will receive proposals until two P. M., May 24, 1883, for the erection of a Court House in the city of *Valparaiso*. The plans and specifications can be seen at the Auditor's office in Valparaiso, and at the office of J. C. Cochran, architect, No. 78 Ashland Block, corner Clark and Randolph streets, Chicago. Contractors can obtain printed instructions as to requirements and form of proposals, upon application to the auditor or architect.

[Signed] L. P. SCOTT, N. PICKRELL, F. BURSTROM, } *Board of Commissioners.*

[Attest] W. E. BROWN, *Auditor Porter County.*

Proposals will be received by Board of Administrators, Insane Asylum at Jackson, Louisiana, until 12 o'clock, May 6, 1883, for 235,000 feet of dressed and undressed lumber. For particulars, address,

Dr. J. W. JONES, *Secretary.*

For the grading and masonry of the extension of the Bangor and Piscataquis R. R., from Blanchard to Moosehead Lake, 14 miles, will be received until May 10. Address,

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For building an iron superstructure of a bridge over Duck Creek, Columbia Township, Ohio, will be received until May 12, 1883. For particulars, address,

W. O. CAPPELLER,
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For information as to public work to be done in Kansas City, Mo., during the present season, address,

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For building wings to hospitals at Rochester, Minn., and St. Peter, Minn., will be received by Secretary of Minnesota Hospitals for the Insane, until noon, May 15. For particulars, address,

A. L. SACKETT, *Sec'y Board of Trustees, St. Peter, Minn.*

For the erection of a Laboratory building and workshop connected with the *College of the City of New York*, will be received until 4 o'clock P. M., May 10. Plans and information may be had at office.

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The Secretary of the Navy will receive sealed proposals until noon July 2, 1883, for the construction by contract of three steam crusiers and one dispatch boat.

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Proposals for enlarging and increasing the water supply of *Quebec* will be received until May 15. For conditions, etc., address

C. BAILLAIRGE, C.E., Quebec.

Proposals will be received until May 7 for the construction of section C of the Buffalo Trunk Sewer. Address

D. C. BEARD, *Chairman Board of Sewer Commissioners,* Buffalo, N. Y.

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[CONTINUED FROM PAGE 515.]

terly; a, M. W. Salmon....28 W 44th st, br stable and dwel; cost abt $15,000; o, A. V. H. Stuyvesant; a, H. R. Marshall; b, not selected... Av A, s e cor 57th st, br store and ten; cost, $16,000; o, Schmitt & Schwanenfluegel; a, A. Pfund & Son....3d av, n w cor 95th st, four br st stores and ten; cost, each, $12,000; o and b, John D. Karst; a, F. S. Barus....4th av, s w cor 112th st, five br flats; cost, each, $20,000; o, J. J. O'Sullivan; a, R. Rosenstock....Pleasant av, n w cor 119th st, brown stone ten; cost $18,000; o, John Dawson and Wm. Archer; a, Thom & Wilson; day's work ...119th st, n s, 75 w Pleasant av, br apart h; cost, $25,000; o, same as last; a, Thom & Wilson; day's work.. 70th st, n s, 100 w 2d av, five brown st ten; cost, $16,000; o, John C. Umberfield; a, A. B. Ogden 2d av, n w cor 103d st, two br stores and ten; cost, $20,000; o, a and b, John Baird....114th st, n s, abt 325 e 1st av, three br apart h; cost, each, $8,000; o, Mrs. Margt. Schmitt; a, G. M. Walgrove; b, Frank Schmitt....125th st, Manhattan st and 9th av, br ten; cost, $75,000; o, Jared W. Bell; a, Thayer & Robinson ....6th av, s w cor 122d st, five brown st dwels; cost, each, $18,000; o, A. B. Van Dusen ...122d st, s s, 80 w 6th av, brown st dwel; cost, $18,000; o, A. B. VanDusen..126th st, s s, 330 e 7th av, br dwel; cost, $20,000; o, Samuel O. Wright; a, Cleverdon & Putzel ...Courtlandt av, e s, 28.3 n 148th st, fr store and dwel; cost, $5,100; o, Charles Spillner; a, H. Piering... 152d st, n s, 255.8 w 3d av, fr ten; cost, $6,000; o, Jas. H. Riley; a, M. J. Garvin; b, P. Garvin & Son.

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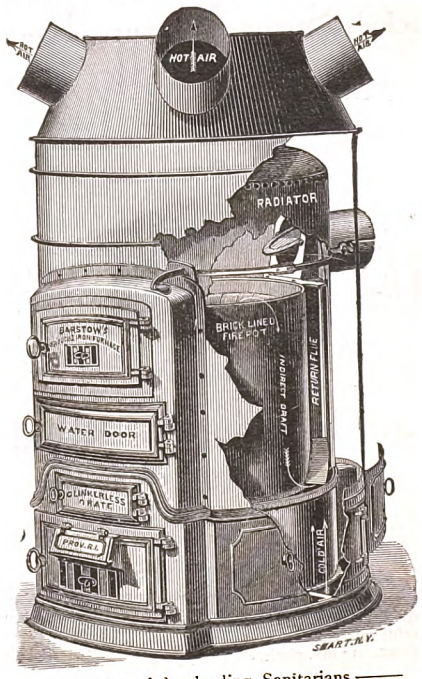

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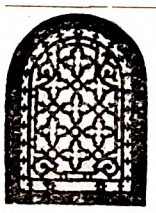

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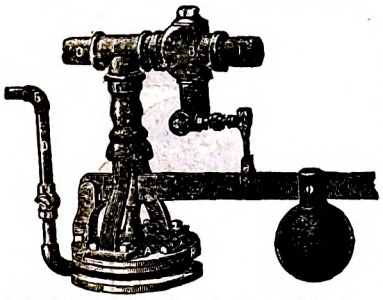

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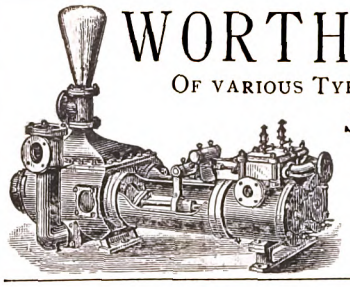

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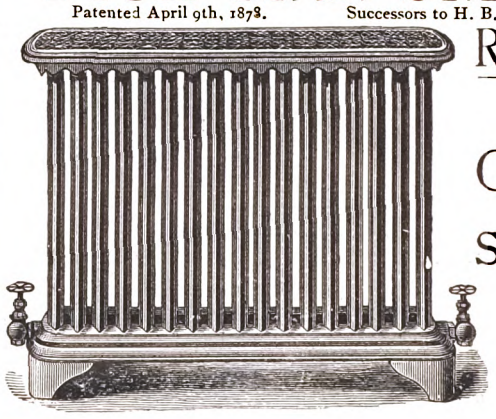

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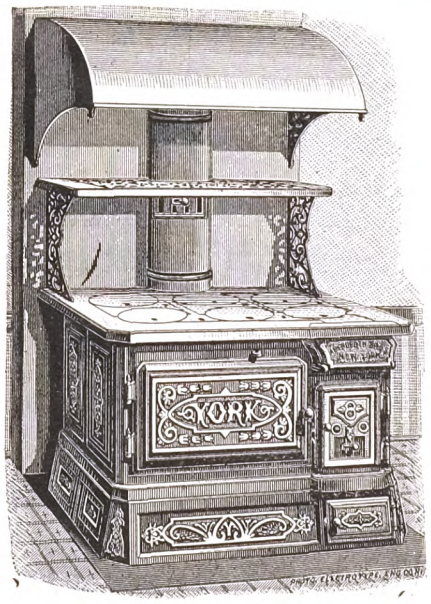

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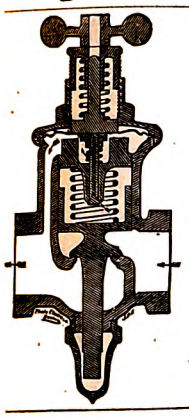

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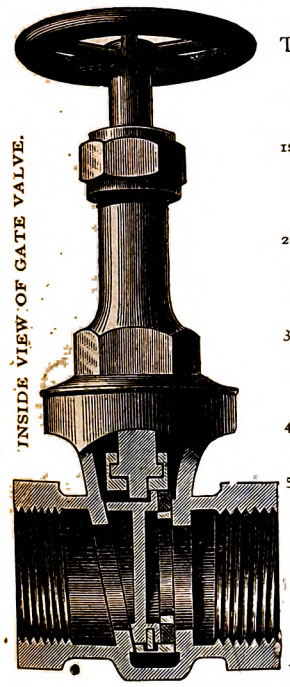

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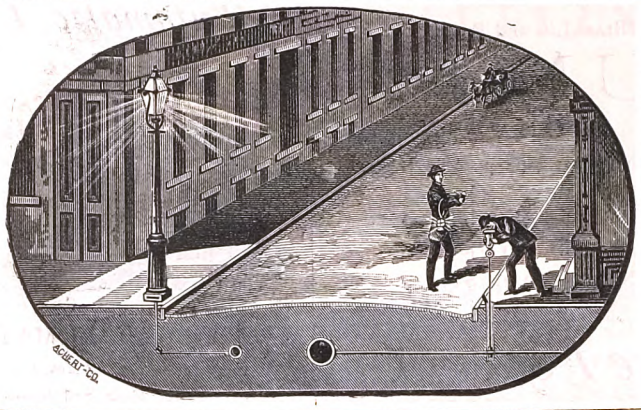

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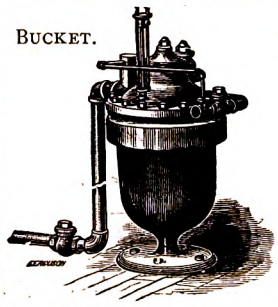

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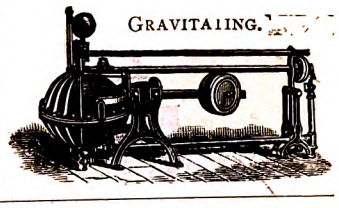

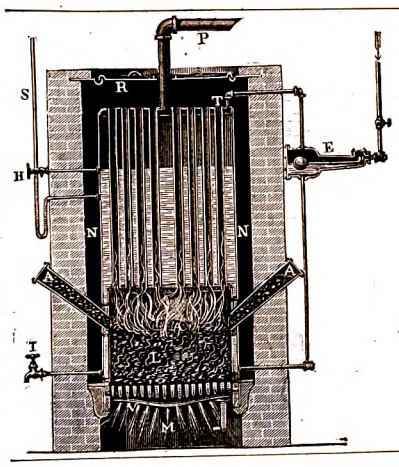

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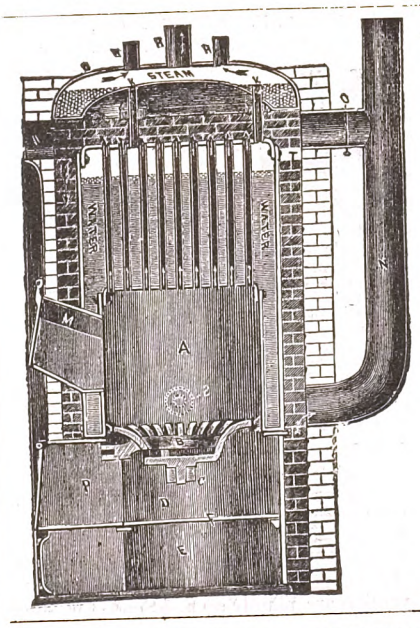

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ANTI-FREEZING PUMP, AIR PUMPS,

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BRASS WORK.

FOR WATER AND STEAM.

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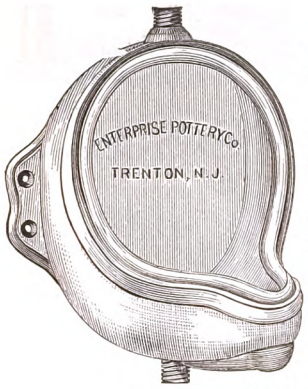

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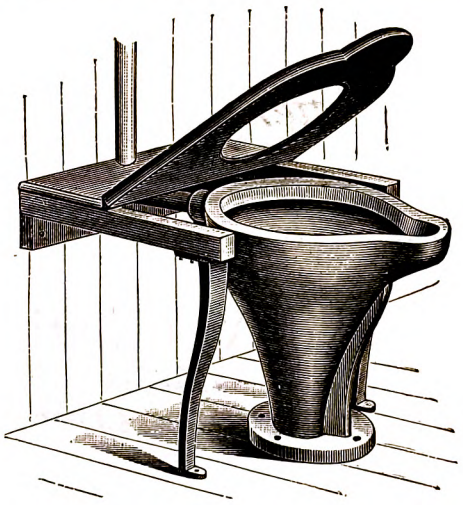

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COMBINED,

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Sanitary Specialties in Earthenware,

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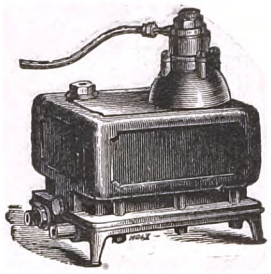

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A few words on their Arrangement and Management; more especially their treatment during Frost, and how to avoid Explosions. By H. Grimshaw, F. C. S., late Demonstrator in the Laboratory of the Owens College, Manchester. Price, 40 cts.

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A large number of these Pumps have been put on every variety of service during the past three years, with the best results.

The Pump is simple in construction, having a smaller number of moving parts than others.

It will work equally well under a light or heavy pressure, at a higher speed, with less noise than any other steam pump, and is suited for every variety of sevice.

All Pumps are tested at the factory under all possible speeds and pressures.

We are prepared at present to furnish all the leading sizes, and are constantly making additions to our patterns.

Send for price lists and discounts to the

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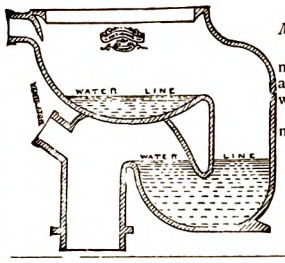
The "National" Patent Side Outlet Closet and Trap.

WITH IMPROVED FLUSH. (Registered).



Made either complete in one piece of Earthenware, or in two pieces with Basin and Trap separate.

An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin

The Most Cleanly, Durable, Effective and Cheapest Closet and Trap ever used, requires no fittings nor Machinery of any kind, and cannot get out of order.

For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

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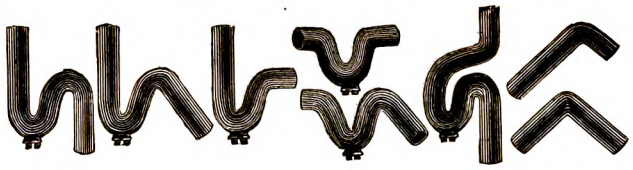
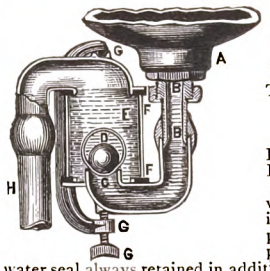


These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

For sale by all dealers in Plumbers' Supplies.



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The only Brass Trap in the market at Popular Prices.

Recommends itself to Architects, Plumbers, Sanitary Engineers and Builders, because:—

It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted Glass or metal section furnished at same price. Send for circular and price list.

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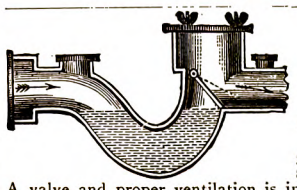

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IMPROVED

IRON SEWER GAS

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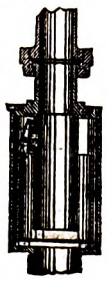
BACK WATER TRAP

Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.



To Prevent Malaria.

Use PIETSCH'S STENCH TRAP, tried and found satisfactory by the New York Health Department apparatus.

Cannot siphon out.

Water seal always perfect.

Made of Brass, Porcelain or glass. When of Glass, the workings and benefits of the invention are plainly seen. Send for illustrated Circular. Address,

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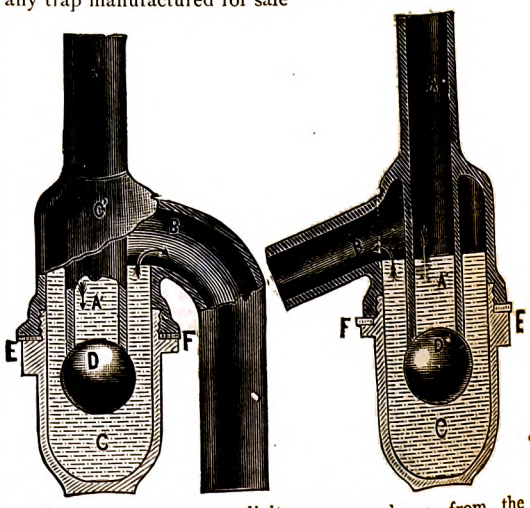
A Positive Valve Seal. A Sound Water Seal.

Simple, Cheap, Effective and Durable.

Under the severest tests to which a trap could be subjected by a commission appointed by the National Board of Health, and whose report was printed in full in THE SANITARY ENGINEER, it will be seen that the BOWER TRAP offered greater resistance to syphonage action than any trap manufactured for sale



The Manufacturers solicit correspondence from the public, especially the Trade and Architects.

Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

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No. 1

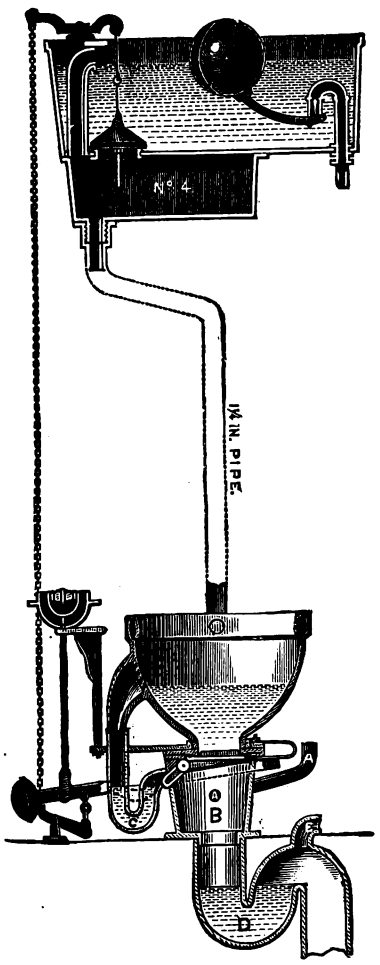
WATER-CLOSET APPARATUS

CONSISTS OF A

HELLYER

WATER-CLOSET.

With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



The names of some of the parties using them and those having them for sale with full descriptive circulars, will be mailed on application to us.

THE BRIGHTON.

There is a tendency in some quarters to demand a Hopper form of Water Closet and to dispense with what are called mechanical parts. This would be desirable, if the so-called mechanical parts did not secure advantages in the matter of a large body of water in the bowl, not otherwise obtainable, without resorting to methods not everywhere applicable or sufficiently demonstrated as practicable.

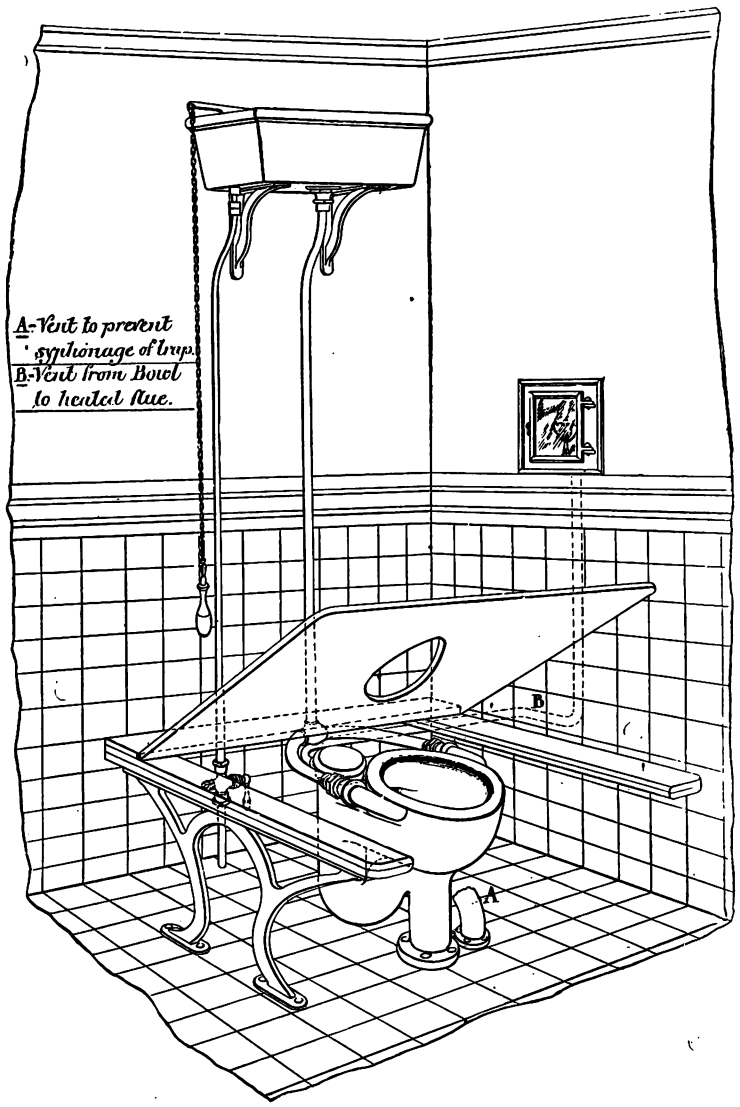
The Brighton Closet here illustrated is, we believe, the best compromise yet devised between the Hellyer form on the one hand and the Hopper on the other.

By examining the sectional cut, it will be seen that the bottom of the bowl is covered with water, while the flush and shape of the bowl is such that the trunk on the back is kept clean.

It is attractive in appearance, being all in one piece, of white earthenware.

The pipe *B*, connected with the trunk, can be run into a heated flue when desired.

These Closets have had a large sale in England during the past four years. We have had them in use in our factory nearly three years—and we now offer them to those who prefer a different form of Water Closet than the *Hellyer, which, by the way, does not, in a single instance, so far as we know, fail to satisfy those who have them in use.*



This will be known as

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Persons interested are invited to call at our warerooms, Nos. 46 and 48 Cliff Street, New York, or at No. 1 Pemberton Square, Boston, and examine this and other specialties that we have fitted up with water attached, including THE ROYAL PORCELAIN BATH, THE MODEL PORCELAIN SLOP HOPPER, THE HELLYER CLOSET AND HOPPER, THE RHOADES HOPPER, DOHERTY SELF-CLOSING COCKS, FULLER FAUCETS, etc.

MEYER, SNIFFEN & CO.,

Sole Eastern Manufacturers of the

Fuller & Fuller-Meyer Faucets and Fine Plumbing Materials, and Dealers in Water, Gas and Steam Supplies,

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General Agents, and Sole Manufacturers for the West, of

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Imported Art Tiles

From Minton's, Maw's and Boote's,

Suitable for Churches, Public Buildings, Halls, Vestibules, etc., etc. Mantel Facings, Hearths, Flower Boxes, Furniture and External Decorations.

Special Designs and Estimates supplied without charge.

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Compression Bibbs,

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are larger, heavier and more serviceable than any others made.

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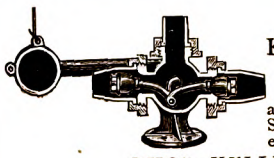

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A powerful and rapid exhaust Ventilator. Simple, cheap and effective.

FOR VENTILATING SOIL PIPES, WATER CLOSETS, ETC. ODORS FROM SEWERS ARE CARRIED OFF. Working Models mailed on receipt of 20 cents. Large sizes for ventilating Schools, Halls, Hospitals, etc.

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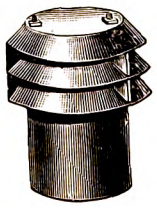

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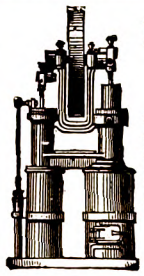

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For city or country residences where it is required to raise a supply of water, is the most *Perfect Pumping Machine* in the market. Its marvellous *Simplicity*, absolute *Safety*, great *Economy* and *Effectiveness*, render it far superior to all others. Can be run by any inexperienced person. Send for catalogue and price list to

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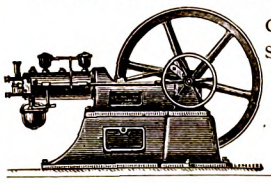

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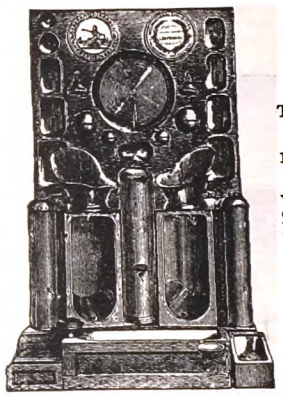

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Dealers in all kinds of TINNED AND PLANISHED COPPER.

143 & 145 E. 31st St N. Y.

We make our BATH TUBS all weights, 10, 12, 14, 16, 18 and 20 oz. and upwards, guaranteed. EACH TUB stamped thus:

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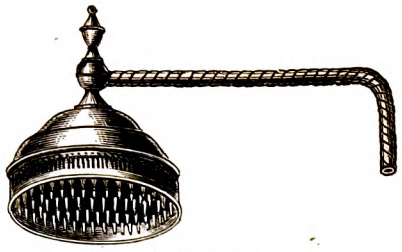
COPPER AND GALVANIZED IRON RANGE

BOILERS.

COPPER, ZINC AND NICKEL PLATED

BATH TUBS.



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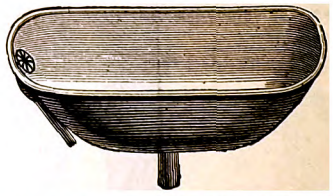
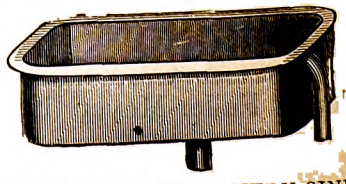


BUTLERS' OVAL PANTRY SINKS.



BUTLERS' SQUARE PANTRY SINKS.

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LONDON, 1862.

PARIS, 1867.

PARIS, 1878

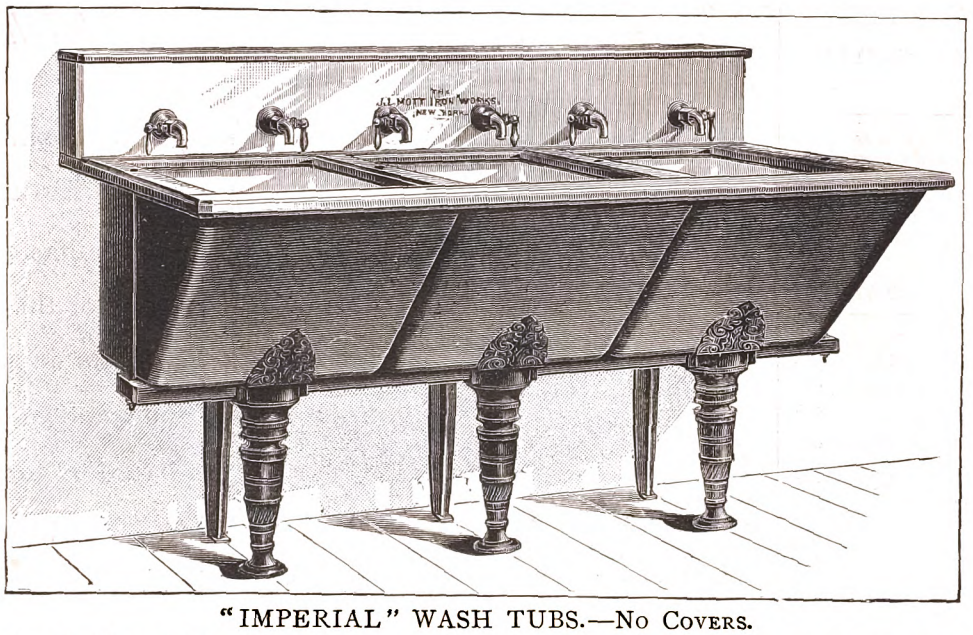
"IMPERIAL"

Porcelain Wash Tubs,

Manufactured in England exclusively for, and Imported only by

THE J. L. MOTT IRON WORKS,

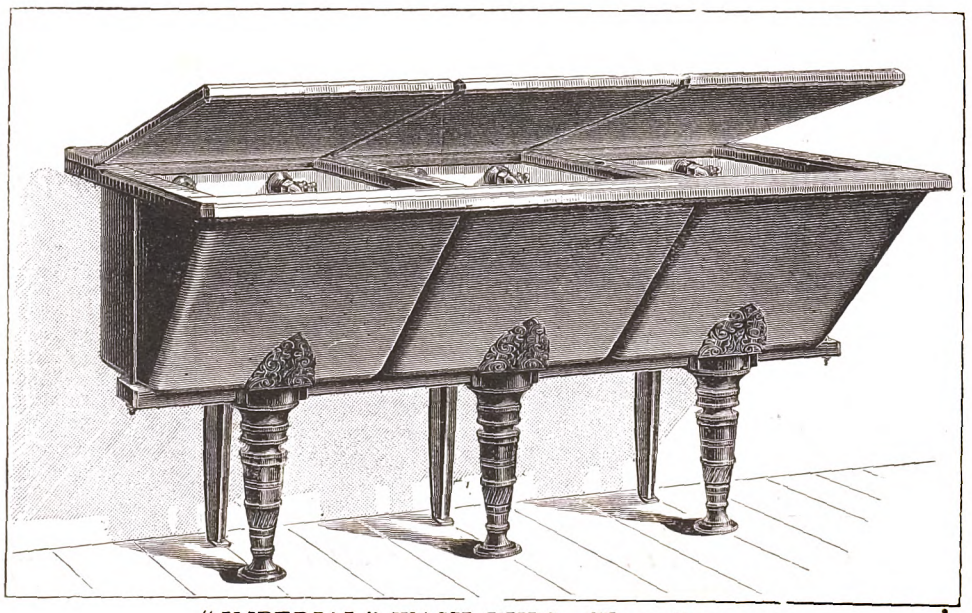
88 and 90 BEEKMAN STREET, NEW YORK.



"IMPERIAL" WASH TUBS.—No Covers.

The above illustration shows the "Imperial" Porcelain Wash Tubs set up without covers, and with Faucets over top, which is now considered the most approved style of fitting up these Tubs, as it not only gives more room inside, but admits of a much better arrangement of the supply pipes, getting them over the Tubs, instead of behind, where they can be readily got at in case of leak or necessary repairs. A sliding cover can also be made for Tubs put up in above manner if desired, although we should very much prefer them just as shown, *i. e.* showing the beautiful clean porcelain surface.

Note.—*When Tubs are wanted to fit up in above manner, please order without Faucet Holes in back.*



"IMPERIAL" WASH TUBS.—With Covers.

Note.—*When Tubs are wanted to fit up in above manner please order with Faucet Holes in back.*

In calling the attention of Architects, Plumbers and others to these Tubs, it is probably enough to say that they are in material and finish in all respects the same as our "Imperial" Porcelain Bath Tubs, being perfectly modelled, delicate and uniform in color, with a glaze which is simply perfect and unapproached by anything of the kind yet made. They should be seen by all who are in the market for such goods, before specifying or purchasing any other kind.

COMPLETE ILLUSTRATED CIRCULARS WITH PRICES ON APPLICATION.

All our Sanitary Specialties are fitted up with water attached and may be seen at our Warerooms, 88 and 90 Beekman St

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NEW YORK, WEST SHORE AND BUFFALO,

Are to be furnished with water closet drainage by the Durham House Drainage Co., 187 Broadway.

The Durham System of House Drainage has been adopted for the new building for the

SCHOOL OF MINES,

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The use of inferior materials and workmanship for house drainage is a serious error of judgment. The adoption of the Durham System insures a saving of LIFE, HEALTH and MONEY; there will be no repairs required in a lifetime.

Examine the work personally, or send for the ILLUSTRATED PAMPHLET published by the Company.

MINTONS' TILES, *Glazed and Unglazed.*

For VESTIBULES, HALLS, HEARTHS, etc., and for Exterior Decoration. Also, Plain White, and Tinted Tiles, for KITCHENS, BATH ROOMS, WATER CLOSETS, etc.
Also, PLUMBERS' MATERIALS of all kinds.

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NOTICE.—Correspondents will prevent needless delays and annoyance if they will address all communications, except those of a strictly private nature, to THE SANITARY ENGINEER. Checks should also be drawn to the same order.

It has been suggested that a description and sketch of the expired patents of the more important appliances used in plumbing and steam fitting would be of interest to our readers, as indicating the prior state of the art, so far as the records of the United States Patent Office can show it. We begin, therefore, in this issue, the first article on Water Closets, and shall print alternately an article on Water Closets and an article on Steam Heating Apparatus, as our space permits.

THE RAID ON ADULTERATED TEA.

No little excitement was produced in the tea trade last week, when an auction sale of tea was stopped by an injunction issued by Judge Sedgwick on application of Prof. Charles F. Chandler, President of the New York Board of Health, and chairman of the Sanitary Committee of the State Board of Health. John H. Draper & Co., the auctioneers, had advertised to sell at public auction, beginning at noon May 3, "several thousand packages of 'choice teas.'" The sale had progressed until lot 113 was put up, when the messenger from the court with the injunction order reached the salesroom. The teas whose sale was enjoined were some 3,600 packages of "Pingsueys," catalogued as lot 119 and upward.

In the affidavits Professor Chandler declared that the teas were adulterated and unfit for food. He had examined samples of them and discovered that they were all mixed with mineral substances, and were an imitation of another and a better article, and if allowed to be sold they would be distributed among the small dealers, and thereby cause great injury and damage. He found the teas, he further declares, colored, coated and powdered, so as to deceive the public. Dr. E. G. Love, public analyst of the State Board of Health, declared that the teas referred to had been adulterated by the addition of mineral matter, which made them appear better than they really were, and of greater value; that they had been colored and coated with a much inferior and cheaper substance, whereby damage and the poor quality of the teas were concealed, and that the mineral matter rendered the teas unwholesome. Charles G. Boardman and William Macgregor, tea importers and experts, testified to the authenticity of the samples and that they were adulterated.

The health authorities, fortified with these affidavits, acted in accordance with the provisions of Chapter 407 of the Laws of 1881, entitled "An act to prevent the sale of adulterated food," and also under certain sections of the Sanitary Code. One section of the State law referring to teas makes it a misdemeanor to sell them "if colored, or coated, or polished, or powdered, whereby damage is concealed or made to appear better than they really are, or of greater value." Congress at the last session also passed a stringent law against the importation of adulterated teas. But this law did not apply to teas then shipped and it appears that this lot, as well as several still *en route* by sailing vessels, could not be excluded by the United States Inspectors.

Fortunately, however, our readers will remember, we were able to secure the passage of a food adulteration law in this State, which fully meets such cases, and under that, which is presented in our issue of June 15, 1881, our health officials have made this move which, it is to be hoped, will result in compelling the removal from this country of the trash, which has for some time been excluded from England, but which in consequence, an English syndicate of speculators have been shipping to the United States, to commission merchants, who, by means of auction sales, have distributed it throughout the country.

There has been a disposition on the part of certain persons to complain that this movement was a sort of a "snap" judgment action, inspired by trade jealousy, etc., on the part of business rivals; it may therefore be proper to state why the consignees and auctioneers had so little notice. About two o'clock on Wednesday, the sale being advertised to take place the next day at noon, we were informed that this lot of teas were to be sold, and it was explained that under the United States act of March 2, 1883, it could not be prevented, and that fact was regarded as most unfortunate, as it was said that these goods were particularly vile.

It thereupon occurred to us, that if authentic samples could be obtained and submitted to the health authorities at once, the sale might be stopped; the attempt was made, and within two hours the writer had secured the samples, and induced Mr. E. G. Boardman, and Mr. William Macgregor to go with him to Prof. Chandler, who at once decided to hold a conference with his colleagues and Col. Prentice, the attorney of the Board. This was held in the evening, and the action to be taken agreed upon. Meanwhile, Dr. E. G. Love the State analyst, and Dr. Chandler had examined the teas, and were prepared to testify. All hands were early next morning at Board of Health rooms, and by the aid of a large staff of clerks, the attorney of the Board was able to complete the various affidavits and

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papers a little after twelve. He was then rapidly driven to the court room, and the order was signed, and served before one o'clock. To act with greater promptness would have been a physical impossibility.

Whatever may be the outcome of these proceedings, the reputable tea importers and the tea consumers of the country, are under obligations to Prof. Chandler, who acted in the dual capacity of President of the New York City Board of Health and Chairman of the Sanitary Committee of the State Board, and to Col. W. P. Prentice, the attorney of the Board, for their zeal and promptitude, as well as to Messrs. Boardman and Macgregor, who had the nerve and independence to act as witnesses in the emergency, and so far as the action of the health officials is concerned, the New York *Tribune* aptly says, "A few practical steps of that character will have more effect than volumes of reports on the subject of adulteration."

ON THE TITLES OF SANITARY ARTICLES.

We have for some time intended to publish, for the benefit of those who prepare sanitary exhortations for the daily press, a series of titles and head-lines suited to the kind of matter which will be usually printed beneath them.

Thus far, however, we have been too busy about other things to attend to this, and, in fact, had overlooked it, when we came across one of our pet titles at the head of an article in the New York *Morning Journal*, although slightly curtailed. This title is as follows:

THE SERPENT OF CIVILIZATION.

How its Slimy Coils Sinuate Beneath a City and its Poison Breathes at Every Bedside.

While this is calculated to attract attention, we think that our own title was better. It was as follows:

THE SERPENT OF CIVILIZATION; OR, THE SUCCUBUS OF SLUSH.

How Its Slimy Coils Sinuate and Slidder in the Sewers and Slums.

Now, when you have got a title like that, it makes no difference what the quality of the article is, it is bound to be read, and, therefore, it will sell.

Unfortunately, we have not space just now to give the rest of our titles—most of which require a good deal of room—but we will try to supply the want in the near future.

SANITARY LEGISLATION AND VINEGAR IN MASSACHUSETTS.

We have received a copy of a report made to the House of Representatives of Massachusetts, on the 14th of March last, from its Committee on Public Health, by Horace L. Bowker, presenting the following proposed act:

SECTION I. The mayor of every city and the selectmen of every town of more than two thousand inhabitants, shall annually appoint one or more competent persons to be inspectors of milk, butter, cheese, and other articles of food and drink, who shall be sworn to the faithful discharge of their duties. The selectmen of any other town may, and if the town at any legal meeting so directs, shall appoint such inspectors.

SEC. II. It shall be the duty of the city or town to provide suitable compensation for inspectors so appointed, and to furnish them the necessary facilities for the proper discharge of their duties.

SEC. III. It shall be the duty of such inspectors to make frequent examinations of milk, butter, cheese, or other articles of food or drink sold, or offered for sale, and to take samples of any article suspected to be adulterated or illegal, and make, or cause to be made, *proper examination thereof at the expense of the city or town, not exceeding ten dollars in any case*, unless the consent of the mayor or selectmen to incur greater expense is first obtained. If, upon such examination or analysis, any such article is found to be adulterated or illegal, the inspector shall forthwith cause prosecution to be made of any offending party.

SEC. IV. All fines imposed for any offence prosecuted by such inspectors, together with the expense of the examination or analysis in the case, which shall be added to the fine imposed, shall be paid to the city or town, and the taxable costs of prosecution to the county in which the offence is committed.

SEC. V. *Section seventy-one* of chapter sixty of the Public Statutes, and *section five* of chapter two hundred and sixty-three of the acts of the year eighteen hundred and eighty-two are hereby repealed.

SEC. VI. For the purpose of the appointment and qualification of inspectors, this act shall take effect upon its passage, and shall take full effect on the first day of July next.

This is a very bad law, and highly discreditable to the committee reporting it. The requiring every town of more than two thousand inhabitants to appoint a food inspector, and to provide compensation for him, and the giving such inspector the power to make as many analyses as he pleases at the rate of ten dollars for each case, would create an intolerable burden, and offers a direct premium for useless work.

The last section repealing certain statutes by name, we find, on inquiry, repeals the clause requiring inspection of vinegar, and when we add that the reporter of the bill, Mr. Bowker, is a vinegar manufacturer, it is easy to understand the true inwardness of the bill.

The Committee on Public Health of the House of Representatives of Massachusetts is under the leadership of Mr. Bowker, earning for itself in this and other matters before it an exceedingly unenviable reputation, and no member of that committee will be able to shield himself from the odium in which he will find he is held by the intelligent portion of his constituency when he again appeals for votes.

THE HEALTH ORGANIZATION OF CINCINNATI.

Near the close of its recent session, the Legislature of the State of Ohio passed an act abolishing the Board of Health of Cincinnati, and providing that the Superior Court might appoint a Health Commissioner for the city. It also provided that in case the court failed to make such an appointment, the City Council might create a new health board. The Supreme Court having taken the matter into consideration, has decided not to make any appointment, for the reason that the Health Commissioner is authorized and required to appoint a large number of subordinate officers, nearly two hundred in number, receiving salaries and pay, and that such an appointment would therefore include a large portion of the ordinary government of the city. The court remarks that "that portion of government which we are specially intrusted to uphold is the judiciary, and if courts should be constituted boards for the appointment to political offices, we should not long, especially under one system of elective judiciary, with short terms, have anything that could be properly called a judiciary."

While it is to be regretted, on account of the health interests of the city, that the court felt compelled to take this view, it seems to us that there can be little doubt as to the wisdom of its decision.

The Board of Health of Cincinnati, abolished by the recent law, has been of very bad repute. But if the people of Cincinnati cannot exert influence enough upon their city government to obtain proper appointments in the health organization, they had better suffer enough to induce them to secure that influence at the polls. It is true that the innocent must thus suffer with the guilty, but it is only by bitter experience that the evils connected with our municipal forms of government can be learned and avoided.

And it must be remembered, that those who will appoint and maintain an inefficient and corrupt board of health, will also appoint and maintain inefficient and corrupt officials in other departments.

To attempt to secure efficiency, by giving a portion of the appointing power to the courts is not to reach the root of the evil—the true remedy can only be applied by the people themselves.

We are indebted to Mr. Joseph Parry, Engineer of the Liverpool Water Works, for some data regarding their water supply for 1882, which we elsewhere print, and which is of especial interest just at this time to New Yorkers. It will be seen that the total consumption per capita during 1882 was 23.05 imperial gallons in twenty-four hours.

Of the plumbing fittings tested, notwithstanding the fact that manufacturers knew their goods were to be subjected to a rigid inspection, yet out of 64,195 submitted, 10,753 were rejected; and of articles for corporation use, out of 13,677 offered, 2,148 were rejected. Revenue from fees for testing was £724.1.6.

In view of these figures, what must be the percentage of leaking and worthless fittings used in New York, where dealers know that no testing is to be done?

THE DISPOSAL OF SEWAGE BY SUB-SURFACE IRRIGATION IN SUBURBAN RESIDENCES.

BY EDWARD S. PHILBRICK, C.E.

There are so many places where this system is applicable, and its merits are so great in such places, that a full and detailed description of it may be of interest.

The limits of its application are as follows: Wherever a quarter of an acre of grass land is available for a single family of eight or ten persons, or an acre for an aggregate population of eighty persons, so situated that the surface of the sod is five feet or more below the level of the house drain, where it leaves the house or houses, this system will dispose of all their sewage in a satisfactory manner, summer and winter, with very little attention—for a term of years—generally five to ten years at least before the distributing drains need cleansing, and often for a much longer period.

The cost of the works varies according to local conditions. Hitherto it has been difficult to have the work done in a proper manner without the supervision of a civil engineer to lay it out and look after the essential points of the construction. It is the object of this article to remove this item of cost, by so explaining the process and the proper construction of the apparatus as to enable any intelligent mason to do the work with the help of such tools as he is familiar with. An engineer's level may be convenient where considerable distances are to be traversed by the works; but for supplying single houses, nothing is generally needed more costly than a common mason's level, if correct and tolerably sensitive, with a straight-edge twenty feet long.

If house sewage is allowed to flow directly into a system of porous tiles laid under the surface, the fluid parts escape at every joint, and soak into the soil: but the solid matter which may not have become finely divided, is apt to linger in the pipes, and soon fill them up so that they become practically useless until taken up and cleaned.

In order to avoid this result, it has been found necessary to provide a tank or tight cess-pool in which the solid particles of the sewage may become macerated and finely divided by fermentation before entering the distributing pipes. Moreover, if such a tank be allowed to overflow continuously by a driblet into the porous pipes, they become choked even then. The flow must be made intermittent, and be allowed to take place at intervals with such a rush as to fill the whole system of distributing pipes at once and brush away any slight obstructions which may have been deposited by previous discharges. There are two methods of attaining this result. First, by providing a stop gate in the outlet pipe where it leaves the tank, at or near its bottom, to be opened by hand when the tank is full and

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closed again when empty. Second, by a syphon arranged to discharge the tank automatically when filled.

Of course, the latter method is far more satisfactory, if reliable, but it is somewhat more costly, and the syphon is *not* always reliable. Field's syphon has been generally used for this purpose, and though it works well with pure water, and also with sewage when the quantity is large, such as might be obtained by a combination of several families in one system, it is found to need occasional attention when on a scale adapted to a single family of ten persons or less. The principle of the Field syphon is explained below. It is well known that no syphon will work unless the longer or descending limb is filled with water. The drainage of an ordinary house is seldom so profuse as to fill a two-inch pipe, after passing through a tank, which must always equalize the flow, and tend to distribute sudden gushes of water over a longer period.

It had long been known that if the lower or discharging end of a syphon is sealed with water, *i. e.*, if made to dip in a cup previously filled, a subsequent slight flow through the syphon would soon expel the air from the whole of its length, and the syphon would begin to act. The reason for this is found in the fact that the water in dribbling through the syphon carries with it a small quantity of air by friction, just as bubbles of air are always dragged under the surface of water in a basin when pouring more water into it from another vessel held a few feet above. The air would thus be gradually expelled by a slight continuous flow of water, because the water in the cup would prevent its return.

If the syphon be thus arranged and left to itself, it would readily discharge the tank soon after it was filled. But the syphon being full of water and both ends dipping in water after the tank is emptied, the next influx of water from the house would raise the level of the water in the tank slightly and the syphon would at once begin to act again till the level was reduced. Thus the tank could never be filled again unless the syphon be first emptied and rendered inert. It is true that a little air would probably enter the syphon from the tank as soon as the level of the water in the tank is reduced to a point as low as the inner end of the syphon, but the instant a bubble of air so enters, it displaces its bulk of water in the syphon and this water drops back into the tank, raising its level slightly and thereby preventing the entrance of any more air, so that the syphon, though partly emptied perhaps, will still contain water enough in its outer limb to set it in action as soon as the level of the water in the tank is raised a few inches, and the tank is thus not allowed to be filled.

Mr. Rogers Field, C. E., of London, invented the following device to overcome this difficulty: He cut a V-shaped notch in the edge of the cup, so that, as soon as the water ceased to flow, after discharging the tank, the cup would lose a little of its water and expose to the air the lower end of the long limb of the syphon. This admitted the air to the syphon, which soon lost all its water as desired, and remained inert till the tank filled up again. Of course the syphon could not be charged and begin its action again till the driblets running through it were sufficient in volume to keep the V-shaped notch filled by the overflow of the cup and the cup also filled for a sufficient length of time to have all the air expelled from the syphon.

Subsequently, Mr. Field applied a small syphon to empty the cup instead of the V-shaped notch. The small syphon became charged by the rush of water through it while the large syphon was in action, and after the latter had stopped its flow on discharging the tank, the small one in its turn discharged the cup and thus emptied the large one.

Now, both these devices, in which Mr. Field's patent consists, though working with tolerable certainty when supplied by pure water, are found to be uncertain with sewage on a small scale, for the reason that the V-shaped notch in the edge of the cup, or the small syphon if that were used, gets choked with particles of solid matter brought along and deposited by the sewage; so that after a week or two the cup would remain full, and the large syphon would then also remain full, or nearly so, and prevent the tank from being filled again by drawing off its water by driblets as fast as it comes from the house.

(To be Continued.)

SEWER CONNECTIONS TO PRIVATE HOUSES.

Mr. William Henderson, a Boston plumber, sends us the following comments and suggestions on the drainage of houses in the Back Bay district of Boston:—

The houses are built in blocks with an alley between them, through which runs a sewer receiving the house drains on either side through the back yards. This sewer discharges into a large main sewer in the cross street running to the Charles river. The house connections to the alley sewer generally have a running trap from 5 to 15 feet from the wall of the house, and a stand pipe (fresh-air inlet) of four inches in diameter, attached to a branch on the drain on the house side of the trap, though in some cases the stand pipe starts from the inside of the man-hole over the trap, a branch from the trap being left open into the man-hole. These stand pipes are placed at various distances from windows, some being fixed to the wall along side a window, and others against the party fence. The soil pipe is carried up through the roof in various ways—such as on a pitched roof in the centre of it, and on a flat roof close to the chimney stack, with which it is carried up when between two higher buildings. The mouth of the soil pipe is clear of all obstructions, as it should be.

The yard in the rear of the house through which the sewer connection is taken, has a mason's cesspool, which

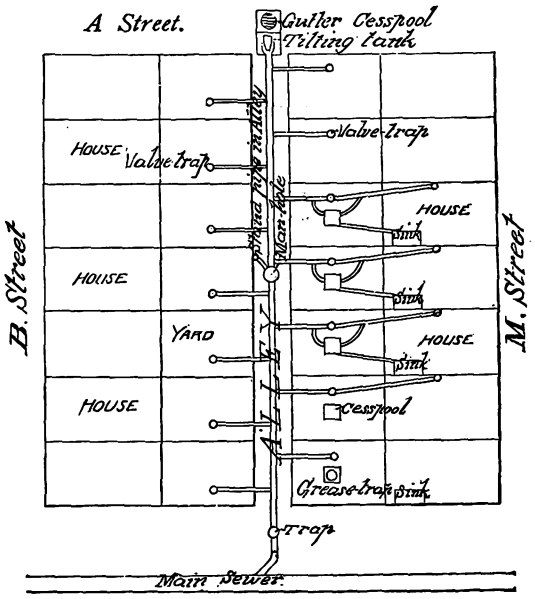

Fig. 1.

in most cases is used for yard drainage alone, but in some cases as grease trap also. The air supply for the furnace is taken from the back yard, and in numerous houses the mouth of the air duct is at the level of the ground, while in some cases, it is extended up 12 feet or more. The yard cesspools are, in many cases, branched into the drain on the *sewer side* of the trap.

The stand pipe in yard or fresh air inlet, as it is often called, owing to position of stand pipe (soil pipe) on roof, when a large discharge of water from baths, or improved closets takes place, acts in the opposite direction, expelling foul air into the yard space, from which, on dull days, or in certain directions of the wind, it does not clear away, but is liable to be taken into the house through the cold air box.

The cesspool in the yard is made of brick, and, being built on made land and by contract, generally does not remain tight long, or, if tight, the water evaporates in long dry spells, thereby allowing a means of escape for gases from the sewer into the yard with the same danger as from the fresh air inlet. Also when used as a grease box, the odors from old grease escape into the yard through the grating.

The sewer in the alley generally has a perforated man-hole cover, through which (owing to the traps on each branch), in certain states of the atmosphere, when water is discharged from houses, sewer gases are forced out into the alley, thereby contaminating the air in the neighborhood.

As an improved plan I would suggest that all houses be connected to drain in back alley-way, as shown in Fig. 1, that is, instead of having a running trap, have a simple rubber or metal valve in a case, with means of getting at it for repairs or examination, as shown in Figure 2.

In the upper part of the valve at the point marked *A*, have a 1¼ inch hole, or any other size to be determined before hand—this hole to allow a certain quantity of air to pass through, when the valve is shut from the sewer to the house side of the valve. Where there is a cesspool in the yard, the outlet of it would be branched into the drain on the sewer side of the valve, and the hole in the valve dispensed with. In place of it make the cover of the grease-box tight by trapping, or by a solid iron cover, and have a hole in the bridge of the grease trap above the water line, and a pipe from the inlet side of the box connected to the house side of the valve (as shown in Fig. 3), so as to cause a circulation of air through the grease-box, in order to carry odors arising from it through the roof.

This would be repeated in every house, and at the end of the main alley drain, where it joins the main sewer, there would be placed a valve or trap, to prevent the entrance of gases from the main sewer. At the other end of the alley where the gutter cesspool is located, place a

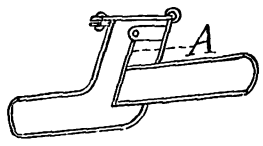

Fig. 2.

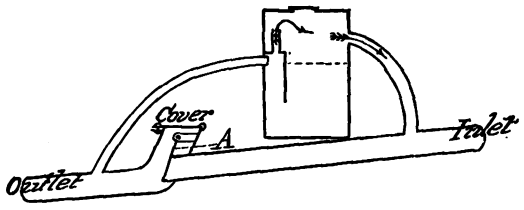

Fig. 3.

sand-box with a bridge in it, open at the top, so that fresh air could be taken into the alley drain through the grated cover of the sand-box, to supply the small pipes attached to the house drain with air. A stand pipe would be necessary to prevent the closing of this fresh-air inlet in winter, when the grating is covered with snow or ice. The gutter cesspool might have a tilting tank.

The advantages gained by this plan would be the removal of the danger from air stand pipe and grease-box escapes, as well as leaks in man-hole covers in alley ways, and from gutter traps (which are most of the time not sealed), and an introduction of an air supply into the soil pipe to keep up a circulation, which would at the same time remove gases in the alley drains through the stand pipes on the roofs, which should have its mouth above all obstructions, and as far as possible from flues or ventilators.

Objection might be made to ventilating the alley sewer through private house soil pipes; but when we consider the objections, they do not appear so serious. The additional length of drain to ventilate would be from 15 to 25 feet for each house, but it would be the cleanest part of the drain, owing to the larger quantity of water flowing through it from sinks and wash trays, and the combined flow of water running in sufficient volume through the alley drain to keep it clear of filth; whereas, the drain inside of the house which leads to the closets, should they be of the pan kind or hopper, with small supply, will be found to retain a large quantity of filth in little bunches above the entrance of the kitchen sink branch, owing to improper use or insufficient flow of water, which lacks power to carry filth off, while the portion of the drain between the sink branch and the yard grease trap is rendered foul by the adhesion of grease to the sides of the pipe—leaving the remainder of the drain, from the trap to the alley sewer, comparatively clean.

The 1¼ inch air inlet (from the alley sewer—through a hole in the valve, or through the grease-box as above described), while allowing sufficient air to pass in to keep up a constant change of air through the soil pipe, would cause a partial vacuum in the soil pipe, owing to the opening at the top being larger than that below, which would tend to draw air into the soil pipe should there be

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any slight defect in the pipe. Should a large flow of water come down the soil pipe, and the 1¼-inch hole not be large enough, the valve would open and allow the escape of the compressed air into the main alley drain; and as there will always be enough houses not having any large discharge at the same time, there will always be sufficient suction to carry off all the extra air blown into the sewer by this means, thereby preventing the discharge of impure air through man-hole covers, stand pipes and cesspools, into the back yards, where air for the houses is generally taken from, and discharging it instead at a point where it would have the best chance of being dispersed. The reduction of the inlet to 1¼ inch would insure every house taking its quota of foul air from the alley drain, whereas, were all pipes of full size, those at the upper end of the alley sewer would act as fresh-air inlets when any quantity of water was flowing through the drain, and those at the lower end near the trap would act as outlets.

[We are not sure that we fully understand the problem Mr. Henderson proposes to solve. We therefore invite our Boston readers to express their views on his suggestions We may say though that we do not like the idea of placing obstructions like the valve he proposes in a drain, and the risks from a fresh-air inlet that he refers to are unnecessarily exaggerated, and such as they are need not exist.—ED.]

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
May 5.....	27 20	20.28	22.66	29 88	30 22	20.61

E. G. LOVE, Ph.D., *Gas Examiner.*

THE LIGHT OF COAL GAS AS A THEATRE ILLUMINANT.

The lighting of the stage by footlights, as generally carried out, consists of a horizontal pipe with numerous vertical jets of gas, fixed about level with the stage floor, and usually, as a safety precaution, covered with a wire gauze guard. Notwithstanding this latter precaution, however, this arrangement of lighting is not only pregnant with dangers, but is highly unsanitary; as the products of combustion of such a large quantity of gas, and liberated at so low a level, soon produces in the theatre an insufferably high temperature, and contaminates the atmosphere, if not with carbon bisulphide and carbon monoxide—at least with carbon dioxide. For stage illumination, an arrangement can be utilized by which these serious defects would be entirely removed. This arrangement, adopted by M. Garnier for lighting the Grand Opera at Paris, is as follows: The principle is the exhaustion of the products of gaseous combustion of the gaslight by means of an artificial draught, produced by a vertical shaft at one side of the stage leading to the outside of the roof, and in which are fixed two or three rings of gas burners. This shaft communicates with a horizontal draught-tube fixed below the footlight burners on the stage; the horizontal gas-supply pipe, however, passes below the draft tube, supporting a series of small vertical branch pipes, which are arched over the draught tube, and terminates in a reversed burner; that is to say, the flames turn downwards from the top to the bottom of the glasses, and pass into the draft tube. By this means the entire products of combustion are drawn away to the outside air, leaving the stage agreeably cool, and, by the addition of an outer tube to the vertical upcast, the entire stage and lower part of the auditorium might be effectually ventilated. This system has been found to give eminently satisfactory results; the illumination is as effective as the old and dangerous plan, and far more economical; and further, the artists and danseuses can approach close up to the footlight burners without the least danger of the ignition of their costumes, however flimsy, as the rough plate which covers the burners is quite cool. Before the row of footlights are ignited, the interior burners in the vertical draught tube or cast up are lighted, to produce a draught sufficiently strong to draw the flames downwards. A system of reflector lighting has also been tried. The burners were fixed below the stage, the light rays being directed upon it by means of powerful reflectors. This plan was not found to give satisfactory results, and was abandoned.

The central sunlight gas burner, generally used for lighting the auditorium, is admirable in many respects. If the outer shaft is made of refractory material, there can be no source of danger, and, if the outlet is properly arranged the heat of the products of combustion might be so utilized. That such an effective exhaustive power could be obtained as would insure a sufficient removal of air for variously attended performances—as, for instance, on a special benefit night, additional jets might be lighted in the outer shaft, in order to produce a greater exhaustive or vacuum power for ventilation—and, certainly, the vacuum system of ventilation is preferable to the plenum. By the addition of the regenerative principle of burning gas to the sunlight, a more intense light would be obtained, with light rays so light and neutral that the most delicate of color harmonies, both of scenery and costume, could be seen and appreciated.

The sunlight should be sufficiently powerful to amply illuminate every portion of the auditorium and side galleries. The under side of the latter would, to some extent, be in shadow, but gas lights along the corridor walls could safely be fixed, and these lights should also be on the regenerative principle, and have tubes for carrying to the air outside the products of combustion, and, seeing that the principle of regeneration (as carried out in the improved lamps) necessitates completely inclosed globes, there would be no probability of smokers, or others, attempting to obtain a light from them—a dangerous practice—but one not uncommon.

The defects of the gas lighting arrangements for producing scenic effects has been the cause of many fires and explosions. One of the principal dangers is the risk of so reducing the pressure of some of the burners, when a sudden and brilliant illumination is required, that the light of these burners is extinguished, and the gas may thus escape from them, and dangerously jeopardize the safety of the theatre. This danger can be greatly reduced by dividing the supply pipes for the stage into a number of sections, each having independent connection with the main service pipes, and each having a special pressure regulator, the pressure of gas to be so arranged that when the maximum pressure is turned on any of the burners it shall still leave a pressure of gas sufficient to keep the other burners alight. Another danger in scenic gas lighting is caused from the fact that when several burners are suddenly turned out the excessive pressure on the other burners tends to produce in the latter a dangerous enlargement of flame. A simple regulator for each small branch pipe would be the best remedy for this danger.

Ordinarily in theatres the taps for regulating the supply of gas are fixed in various parts of the stage; this division often leads to confusion and is dangerous. In the Grand Opera, at Paris, the regulating arrangements are entirely centralized in a position close to the prompter's box, and under the control of the superintendent of lighting. By means of special sliding gas-taps and simultaneous and independent machinery for turning on and shutting off the taps, an instantaneous and perfectly progressive effect of lighting can be obtained with perfect safety.

There should be no naked lights in any part of the theatre; each light should be provided with wire guards.

The service mains should be entirely exposed to view, but in positions where they would not be exposed to oxidizable influences, and all the private gas mains and pipes of the theatre should be regularly tested. A tester made particularly for this purpose is made by a Salford firm.

A grave danger attends the practice of turning off gas lights simultaneously by a single valve at the meter; for supposing that one of the burners has not been extinguished by its own burner, on again turning the gas on to the burners it will of course escape at this open burner. There should be separate connections to the street mains for each division of the theatre—*ergo*, one for the auditorium, another for the corridors, and another for the stage, each with a separate cut-off fixed in a prominent and external position, so that in case of fire any section of the lighting could be cut off. For lighting the gas, a portable electric lighter, Clark's patent, might with advantage be used.

On no consideration should scenery or decorations of an inflammable nature be placed at a nearer distance than 18 inches horizontally, or three feet six inches vertically from any gas light.

The lighting of the scenic burners should be carried out under the direct superintendence of a responsible person, and not be left to a deputy. It will be remembered that the Nice Theatre disaster was caused by the careless lighting of the scenic burners.—B. H. Thwaite, F.C.S., in *Building News.*

[Most of the above methods and suggestions seem to us practicable and worthy of adoption. The principle spoken of as having been adopted at the Paris Grand Opera House for the removal of the products of combustion from the foot lights is applied, we believe to the proscenium lights in the Madison Square Theatre of this city, but we do not know of any case in this city where it has been applied to the foot lights. In the case of the Madison Square Theatre, however, the exhaust draught is produced by a fan or blower. The expediency of using pressure regulators to us seems doubtful. One of the most experienced theatre gas fitters in this city says he has never found them reliable, and that the remedy in the case above described would be worse than the trouble. If the pipes are large enough the danger spoken of would not exist.

In the new Grand Opera House of this city (the lighting of which we hope to describe when the work is nearer completion) there are separate connections to the street for the stage and auditorium, and the supply so arranged that the lights in the latter, though they may be turned low, cannot be put entirely out from the stage.]

ELECTRIC LIGHT NOTES.

The present condition of electric lighting in the city of London is thus determined from the report of the City Commissioners of Sewers. The experimental arc lighting by the Brush and Maxim Weston Companies is still going on upon the terms of the contract entered upon last year. The incandescent lighting by the Edison Company is still going on, the contractors being paid after the same rate as the original cost of gas.

The Hartford Electric Light Co. has submitted to the city authorities a plan to light the entire city, and the proposition, in official form, will be laid before the council at its meeting two weeks hence. According to this plan a saving of $8,000 will be effected and the city better lighted.

The Common Council of New York has given permission to the Western Union Telegraph Company to lay its wires under the streets of the city on the payment of one cent per lineal foot of each street opened and the giving of two wires for the city's use.

The electrical companies of this city have under consideration a plan for laying wires underground, devised by Mr. William Mackintosh, of Providence, R. I. According to his plan, lines can be run into buildings as gas and water is now taken in.

A committee of seven has been appointed in Boston to note such steps as might be taken by the petitioners in regard to a proposed electric railway on the Back bay. A remonstrance against the granting of the petition has been sent to the City Hall.

In Dubuque, Iowa, an organization has been effected under the title of The United States Electric Light and Power Co., of Iowa. Present capital stock, $50,000, with the probability of an increase to $150,000.

A movement is on foot to establish a school of electric engineering at Brattleboro, Vt., in connection with the old Norwich University, which it is proposed to remove to that town from Northfield.

A bill passed the New York Senate last week, authorizing the commissioner of the new capitol to complete arrangements for lighting it with electricity.

Nashville, Tenn., is to decide whether it will pay $43,000 for electric lights or continue to rely upon gas at a reduced rate.

Commissioner Ropes states that there are 2,500 miles of wire and over 5,000 telegraph and telephone poles in Brooklyn.

Meter-ites.

A printed statement recently laid before the Philadelphia Councilmen, shows from figures taken from the report for 1881 of the gas trustees, that the total cubic feet made that year was 2,209,145,000, of which 1,444,190,800 cubic feet were sold to private consumers, 412,641,932 cubic feet were used for public lights, and the remaining 352,312,268 cubic feet charged to leakage, showing the leakage on the aggregate to amount very nearly to the cubic feet used for public lights. The cost of producing the gas was $1,674,301.07. The cost of distributing it was $389,726.99, the leakage being about ten per cent. in the delivery through the gas mains.

In London the rates for lighting the public lamps by gas are as follows: five feet burner, square, for gas, £3, 8*s.*, 1*d.*; for lighting, 15*s.*, 0*d.*; for repairing, 3*s.*, 0*d.*; total, £4, 6*s.*, 1*d.* ($20.80); five feet burner, circular, for gas, $3, 8*s.*, 1*d.*; for lighting, 15*s.*, 0*d.*; for repairing, 7*s.*, 3*d.*; total, £4, 10*s.*, 4*d.* ($21.84). The number of lighting hours per annum, 4,300. Price of gas, 3*s.*, 2*d.* per 1,000 cubic feet. The difference in the charge between the square lamps and the circular is owing to the additional expense incurred in cleaning and maintaining the circular-shaped lanterns.

In addition to the tests of the various gaslight burners and lamps, now being exhibited at the Crystal Palace, Eng., the Committee of the Gas Institute have arranged for the heating and cooking apparatus to be thoroughly tested and reported upon by the Testing Engineer of this Institution (Mr. D. Kinnear Clark, M. Inst., C.E.), associated with Mr. W. J. Dibdin, the Chemist to the Metropolitan Board of Works, and Professor W. Foster, M.A., of the Chemical Laboratory, Middlesex Hospital.

Mr. Mulholland's bill, providing that the price charged for gas in New York and Brooklyn shall not exceed one dollar and fifty cents per thousand cubic feet, was adversely reported in the Senate.

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WATER CLOSETS.

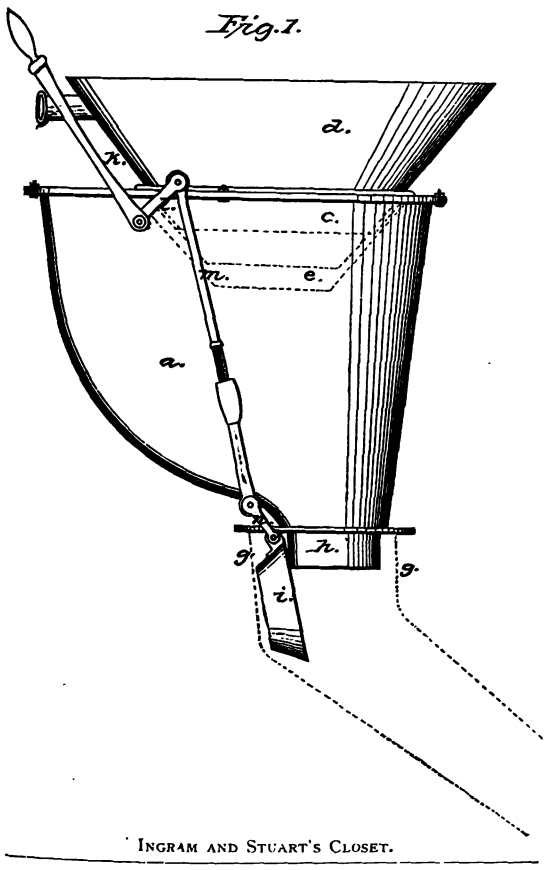
By F. B. Brock, Washington, D. C.

A CHRONOLOGICAL ABSTRACT OF ALL EXPIRED AMERICAN WATER CLOSET PATENTS WHICH ARE PUBLIC PROPERTY.

This series of articles, besides being of general interest to our readers, is of special interest to manufacturers, to patentees, and to owners of existing water closet patents. The manufacturer may ascertain what kind of closet he can make without infringing any patent, and the patentees and owners of patents may see more clearly what and how much they have secured under their grants. To original inventors contemplating protection for their devices, these articles will have a special value. In case, also, a manufacturer be called upon to desist from the manufacture of a certain closet as being an infringement of some existing patent, he can, by referring to these articles, ascertain whether such is the fact, in so far as American expired patents are concerned.

The first patent ever issued by the United States Patent Office for a water closet was granted November 19, 1833, to Edward Robinson of New York, and the second patent for the same invention was issued March 11, 1835, to James Stone of New York. Both the specifications of these patents were destroyed by the fire of 1836.

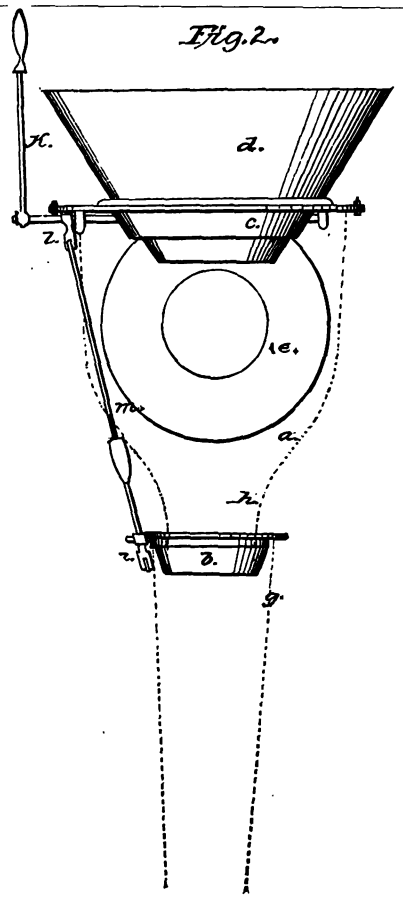
January 13, 1847, James Ingram and James Stuart of New York obtained a patent for a water closet. *a* (Fig. 1) represents the trunk or body, having its top cast with a dip flange *c*, surrounding the hole for the reception of the basin *d*. This basin is made of earthenware, and simply set in the dip flange. The pan *e* is jointed to the underside of the cover of the trunk and so located that when the pan is thrown up and filled with water from the water-pipe *f*, the lower edge of the basin and the dip flange surrounding it project into the water, and thus effectually prevent the escape of gases. A second pivoted pan *i* is located at the juncture of the bottom of the body *a*, and the waste-pipe *g*. It is provided with an operating lever-mechanism, and is so placed, that, when the pan is horizontal and filled with water, the nozzle dips into the water and thus prevents the escape of gases from below that point. The axle to which the upper pan is attached, is provided with a handle *k*, and it is also provided with an arm *l*, connected by means of a pivoted rod *m*, with a similar arm *n* on the axle of the second pan. By this arrangement the upper pan is closed while the lower one is open, and *vice versa*, and by means of it the water discharged from the upper pan as it is opened is caught by the lower as it is being closed, thus cutting off connection with the waste pipe.



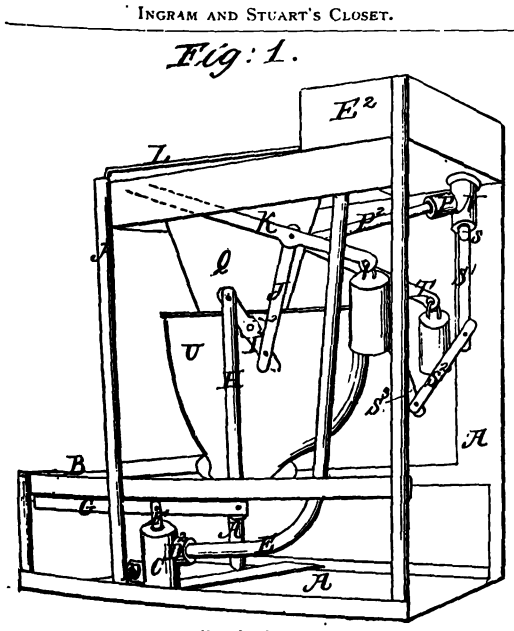
Ingram and Stuart's Closet.

November 13, 1849, Charles C. Bier, also of New York, received protection from the U. S. Patent Office for a water closet. The nature of Bier's construction consisted in the arrangement of a pivoted pan within the lower basin adapted to be filled with water when not in use and emptied when used; and this he accomplished by a system of self-operating levers and pistons arranged underneath the foot and seat boards of the closet.

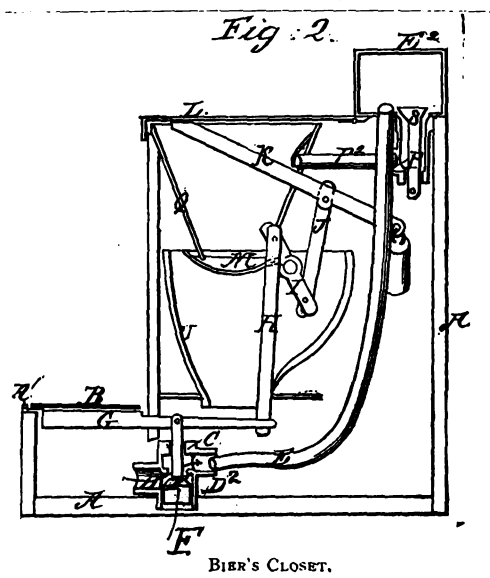
Figure 1 represents a perspective view of the device, and Figure 2, a longitudinal section. *A* is the frame work, and *B* the foot-board pivoted to the front rail of the frame A^1. Underneath this foot-board is arranged the induction cylinder *C*, connecting at *D* with the water-main at D^2 with a pipe *E* communicating with the closet reservoir E^2. The plunger piston *F* has a ground tight seat in the cylinder above orifice *D* and below orifice D^2, so as to operate as a cut-off to both. The force of the water seats the plunger when the end of lever *G* under the foot-board has been released. Attached to lever *G* is another lever *H*, which connects with one end of the tilting lever *I* of the pan *M*. A third lever *J* is attached to the other end of lever *I*, and to a weighted lever *K*. This lever *K* is operated by the seat board *L*, for the purpose of throwing partially back the pan, and also for forcing down the plunger *F* to open communication from the water main to the reservoir E^2. *N* is a second cylinder opening into the reservoir. It has a side orifice *P*, having a pipe P^2 entering the back of the upper basin for discharging water from the reservoir. The plunger *S* of cylinder *N* has attached to it a series of levers S^1, S^2, S^3, and weighted lever *T*, the latter extending across the closet and operated by the seat board for the purpose of cutting off the water from the reservoir to the upper basin O^2 while the closet is in use. Under this basin is a second basin or trap *V*.



Ingram and Stuart's Closet.



Bier's Closet.



Bier's Closet.

William S. Carr, of New York, December 21, 1852, invented a closet operated by the weight of a person to let on water from the main into an air vessel. When the closet is relieved of this weight the supply of water is adapted to be shut off, and the water in the air vessel by its pressure and hydrostatic column operates on a plunger and empties the pan, and at the same time a supply of water cleanses the basin.

Figure 1 is a plan with the seat removed, and Figure 2, a sectional elevation of the closet.

The weight of a person on seat *d* causes it to descend slightly within the guides *c*, forcing down the rod *K* and plug 13, which, pressing on the elastic packing 12, bends it downward and carries with it the head 11, which forces the rod 4, and valves 5 and 7 downward, closing the lower opening by the seat 8, and opening the valve 5. This allows the water to pass into cylinder 1 and through the pipe *h* to the reservoir *B*. If the valves be kept open in this position a sufficient length of time, the pressure in the reservoir due to the compression of air becomes equal to the pressure in the pipe *e*. When the weight is removed from the seat, the spring 10 lifts all the parts directly above it, bringing the parts into the position seen in Figure 2. The water now rushes back from the compression of the air in the reservoir, passing the seat 8 in a regulated amount, and by the pipe *c* enters the cylinder *m*, and by the pipe *o* washes out the pan, the water continuing to run until it finds its level in the pipes *n* and *o*. As the flow of water is not sufficient to keep the plunger 18 above the pipe *o*, for more than probably half the time the water flows, the weight *G* carries the parts down into the position shown by the dotted lines, bringing the pan *r* up to and around the lower end of the basin *D*, catching sufficient water as it passes into the pan to prevent the egress of gases.

Frederick H. Bartholomew, of New York, received letters patent of the United States, February 14, 1854. This patent also has an automatically operating water supply and cut-off. A weight upon the seat *b* presses down through rod *d* the valve *G* on to its seat, and opens valve *F* having communication between the supply pipe and the water chamber *g* through pipe *f*. This chamber or reservoir *g* is an air-tight vessel, and the water entering, compresses the air therein. No water is discharged into the basin while in use. When not in use the spring *H* throws the valve up to its seat, shutting off the supply, and at the same time opening the discharge valve *G*. The water then passes from the reservoir by pipe *f*, past valve *G* into pipe *h*, and flushes the basin.

The inventor says the valve may be operated by being placed under a step, or so attached to the seat lid or door of the closet, that the *raising* of the lid or the opening and closing of the door will operate it. Figure 3 shows a modification of three-way valve. It is thought its operation will be apparent without special description. In it the water enters from below, reversing the arrangement shown by Figure 1. In Figure 1 the valve *F* is kept closed against the head of water, by the spring *H*, in Figure 3, the pressure of the water, combined with the spring, serves to keep the valve normally closed. The rod *d* and valve stem *E* have a thimble or socket *K*, *I*, respectively, which bear against an interposed flexible diaphragm *D*.

Daniel Ryan and John Flanagan, of New York, patented on March 7, 1854, a water closet, of which the following is a description:

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Figure 1 is a side elevation, and Figure 2 a vertical sectional view. Figure 3 is a plan view.

A is the trunk, and *B* the bowl, *D* is an exit pipe, and *E* the base which supports the apparatus. *F* is a sliding tube working within the trunk *A*. It is provided with two openings *a* and *b*. The opening *a* when the tube is elevated is opposite the pipe *C* at the lower end of the bowl-seat, and the opening *b* is above the exit pipe. *G* is a lever by which the tube *F* is raised, and *H* is a spiral spring which depresses the tube when the lever *G* is relieved from the hand or foot. When the closet is used, and the lever

Fig: 1

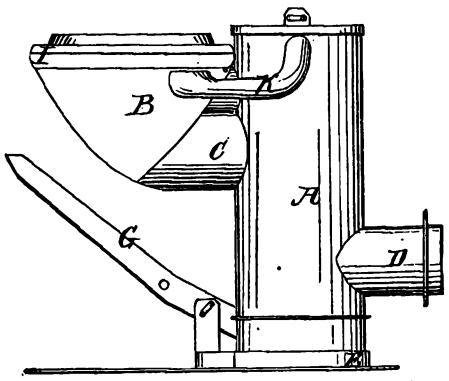


Fig: 2.

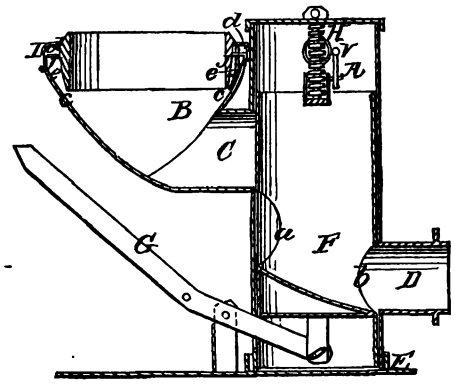
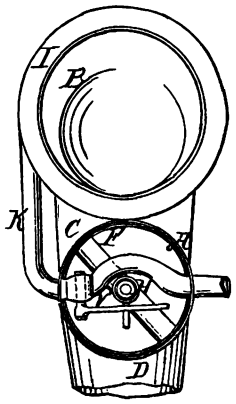


Fig. 3



RYAN AND FLANAGAN'S CLOSET.

G depressed, the sliding tube *F* rises. In so rising it operates the cock *V* in the supply pipe *K* allowing water to pass into the annular compartment *I*. When the closet is not in use, the spring *H* depresses the tube and the water supply is cut off. The pipe *F* empties itself as the opening *b* comes opposite the pipe *D*. The opening *a* is then below the pipe *C*, acting as a cut-off between the bowl and exit. The annular space *I* has an upper compartment *d*, which is filled with water when the bowl is flushed, but which only empties itself gradually, and after the sliding tube has cut off the opening through *C*. Thus water accumulates at this opening to form a water-trap.

[TO BE CONTINUED.]

SCHOOL BUILDINGS OF NEW YORK STATE.

Many of the schools of our State are in a condition to call for particular attention in matters of ventilation, overcrowding, health and even moral requirements, and while the Board of Health find much improvement in these particulars, the following notes from their circular 43*a* will show the necessity for the continual vigilance of its officers.

The report of inspection by committee, who were ably assisted by Dr. Lincoln, states in circular 43*a*: "that although greater attention has been paid in new structures to sanitary laws, yet but one in fifteen of common school-houses are ventilated, and those chiefly by opening windows.

"Over-crowding is a prevailing fault, and a disgusting, degrading neglect of sanitary cleanliness found in school buildings, especially in privies and proper separation there of the sexes; such neglect should be prevented by local sanitary authority which public health and moral and bodily welfare of the children demand.

"Drinking water (except where fortunate in having a public pump near the school), washing apparatus, pegs for wet clothing, all are found wanting.

"Even the school recess is not allowed, and its probable necessity for health ignored; physical exercise, especially gymnastics for little ones, not being appreciated by those in authority.

"Desk arrangements may cause permanent injury to eyesight, and should be regulated by medical advice.

"Vaccination of school children has met with favor by parents, and it seems eminently desirable and practicable to secure compliance with statutes as administered by State Board of Health; the adoption of its sanitary laws being an obvious necessity to health and life in schools."

HARRISBURG HOSPITAL.

Mr. L. M. Simon, the architect, sends us the following particulars in regard to the Harrisburg, Pa., hospital:

The addition now building is 40 feet front by 60 feet deep, three stories high. First story 15 feet; second story 12 feet; third story 11 feet and 6 inches in the clear. At the present only two stories will be finished. The first story has rooms for the managers, physicians, surgeons, operating and drugs, and elevators. The corridors and stair halls are unusually wide and well lighted. The second floor has parlors and reading rooms, and five rooms for patients.

All rooms and halls on the first floor, and nearly all rooms on the second and third floors, have large fire-places for *bottom ventilation*, and flues, adjoining and warmed by the fire of the fire-places, and the gas flues of the furnaces for top ventilation. It is intended to warm the building by two hot air furnaces.

There are no water closets, baths or stationary wash stands in the building proper (excepting a slop sink and wash basin in the operating room, and a wash stand in the drug room). These are located in a building connecting the new portion with the old. This part has windows on opposite sides.

All sewer pipes are in the yard. None are in or under the cellar. The sewer has a trap just inside the pavement line, with fresh air inlet on house side.

A society of citizens of Mount Vernon has been formed for improving the appearance of the village.

Fig. 1

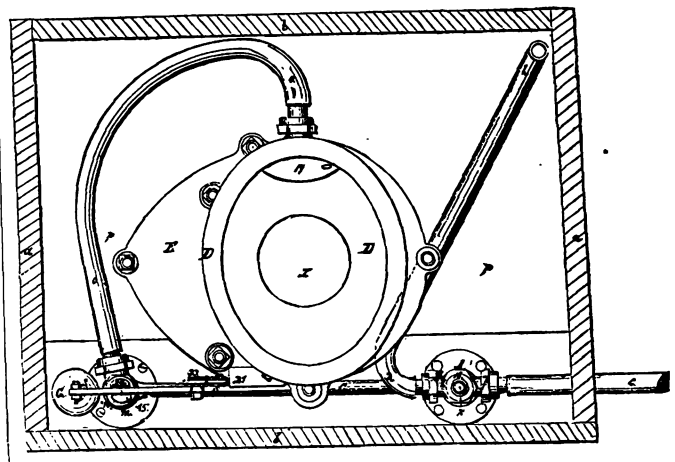
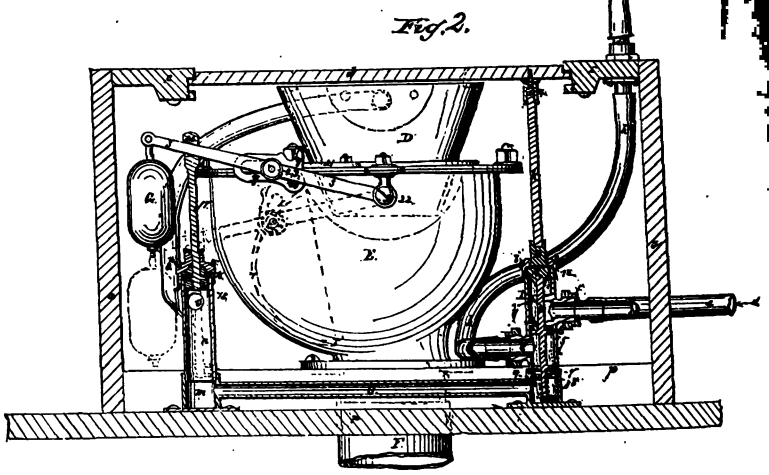


Fig. 2.

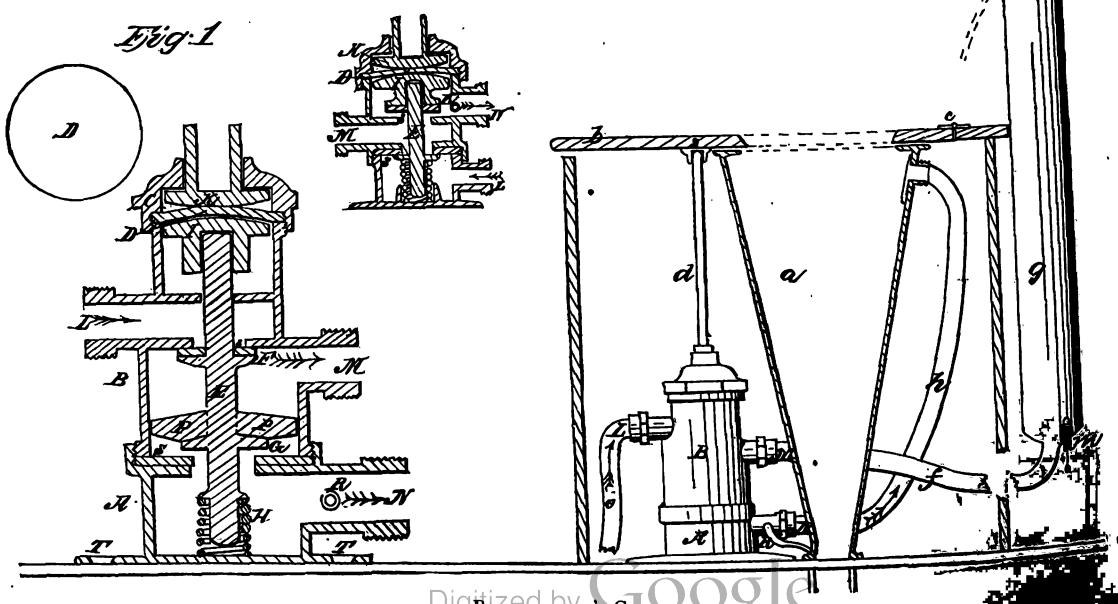


CARR'S CLOSET.

Fig: 3

Fig: 2

Fig: 1



BARTHOLOMEW'S CLOSET.

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Correspondence.

CHECKING WASTE.

NEW YORK, *May* 2, 1883.

To the Editor of THE SANITARY ENGINEER:

Shortly after the publication of the conclusive article on "New York's Water Supply," which appeared in your issue of the 5th inst., the writer began a communication in response to your wish to have those of your readers who have had experience in dealing with the question submit such views in relation to the best method of insuring a permanent and sufficient supply of water in New York City, as seemed to them most feasible. Unlooked for causes prevented its earlier completion. Of course, no single ordinary newspaper article, confined within reasonable limits, can adequately cover all the points referred to in your article of the 5th inst.; hence it will be necessary to allude to only some of them, and that briefly. In order to put myself properly on record at the start, it is, perhaps, better to acknowledge that your first method, "the placing of a meter in every house, assuming no control over plumbing, but relying on the consumer's desire to economize in water tax to secure a stoppage of waste, to cause the reconstruction of defective plumbing and the removal of wasteful fixtures," is the plan, and the only one, in the writer's opinion, that can satisfactorily solve the problem of water supply in New York City, as well as in other large centres of population. This opinion is founded not only upon a personal study and close observation of the question in all its details and by a somewhat lengthy and instructive experience of it, but is fortified by the almost unanimous verdict of all the best engineering talent, not only in this country, but in Europe. There are cities whose public spirited officials have tried all known remedies in their attempts at a solution of this seriously important question, and who have in the end adopted, and continue to maintain the meter system with such successful results that their only regret is that the advantages of it were not earlier known, so that it might have saved the authorities much anxiety, and the public treasury an abundance of the taxpayers' money. Having taken the position specified, I shall endeavor to answer the several questions based upon your proposition in their order.

1. As to the danger that a metered service would tend to prevent any considerable number of people from bathing, etc., the allowance of any ample quantity of water *per capita* for all legitimate uses, for which a certain specified rate would be charged, whether that quantity is used or not, but whatever quantity would be used in addition thereto to be paid for by measurement, would obviate any trouble that might arise, from a sanitary point of view, consequent upon a too stringent economy in its use. As to the action of the usual flushing facilities for closets and urinals, it is a question whether they are in any degree of great value. If it were possible to educate the community to understand that the ordinary dribbling of a closet faucet is practically of no value in cleansing drains or waste pipes, but that the occasional sudden discharge of a pailful or two of water will do the work most effectually, a great point will be gained in preventing a considerable percentage of waste. With a metered service and properly arranged fixtures, this serious item of water waste would necessarily be considerably reduced.

2. Your third query assumes a state of affairs that does not, to any extent, exist. I think it is the rule for the owners of houses in New York City to pay the water tax, as they are held responsible for it by the water department. That being the case, it would certainly be to their interest, in the event of a measured service being applied, to keep their fittings in order and protected from frost; and, necessarily, would make the supervision of plumbing in buildings largely superfluous.

3. No measures are necessary to ascertain what waste is taking place under ground until we have first put an end to the waste that we know is taking place above ground. That done, we can afford, I think, to let the underground waste go. It is an insignificant portion of the great evil which we can permit to continue—at least, until the much greater one is effectually abated. It is generally acknowledged by water works superintendents and engineers that the waste caused by leaky and imperfect fittings is the main cause of the immense consumption of water in all large communities. Mr. William F. Davis, Water Registrar of the City of Boston, whose long official experience and complete knowledge of the water supply question entitles him to be ranked as a high authority, says that according to figures recently made by him, the percentage of waste in that city equals forty per cent., and one of the principal reasons for this waste he states to be the immense number of leaky fixtures. Of this he gives a very striking illustration. About three years ago application was made for a meter to be put in at the Simmons Building, one of the best built, and supposed to be the best plumbed building in Boston. After the meter had been attached, it was found that at night, without a single occupant in the building, except, perhaps, the janitor and his family, the consumption of water was 13,000 gallons, against 9,000 gallons in the daytime, when the building was occupied by the tenants. An examination was made to determine the cause of this enormous waste, and it was found that of the thirty-six tanks with ball-cock fixtures, to operate the flow of water, sixteen were out of order, and the increased pressure in the mains at night, as compared with the daytime, explained the reason. The tanks filled, but the fixtures being out of order the ball did not rise and close the faucet, so that there was a steady flow running off into the waste pipes from these tanks during at least twelve of the twenty-four hours. An extended and searching examination of the waste caused by leaky closet fixtures in the city of Boston was made by the same official, and the figures are somewhat appalling. They are too long for reproduction here. Enough to say, that it was proven there was a waste from this cause alone of nearly 4,500,000 gallons in every twenty-four hours. With a metered service, who doubts but that all this great defect would have been remedied and removed so that it would never recur?

4. The probable expense of placing meters in the houses of New York can probably be arrived at as follows: The number of taps in the city, according to the official figures, is 85,000, of which about 7,000 are now metered, leaving a balance of 78,000 not metered. Of this 78,000 it would not be advisable to meter one-fourth, or they would not be metered, probably, if full power and discretion were given to the Water Department, so that there would remain to meter say 58,500 taps. It would cost for meter, setting, etc., not more than an average of $30, for each tap, or $1,755,000, and they could be furnished and set, it is believed, in two years—certainly in three.

5. If the city should purchase the meters and issue bonds to pay for the same, they would unquestionably be sold at par, paying from three to four per cent. interest—say three and one-half per cent. or $61,425 per annum. The cost of repairs for ten years would not exceed an average of one dollar each—in view of the vast improvement made in recent years in the construction of meters—or five per cent. on the cost of the meters, which on 65,500 meters would amount to $65,500, estimating the average cost of each meter at $20.

New York City consumes a daily average of 95,000,000 gallons of water, 10,000,000 gallons of which are used for public and fire extinguishing purposes. The present annual revenue amounts to $1,640,000, more than one-fifth of which is received for water sold by meter measurement. Assuming that the 85,000,000 gallons consumed by private parties was delivered through meters at a cost of thirteen and one-third cents per thousand gallons, it would give us a yearly revenue of $4,136,563.25, or an excess over the present amount of $2,496,563.25. But the application of meters would reduce the consumption of water to say two-thirds the quantity now used, or, about, in round numbers, 60,000,000 gallons; this quantity, at the same rate per thousand gallons, would bring in a yearly revenue of $2,919,927, or an excess over the present amount of $1,279,927.

6. The clerical staff of the Department would not have to be increased; in fact, it is a question if, in the event of a general application of the meter system, it could not be reduced. There would be less work to perform, the bills calling for but one item.

7. For the city of New York it would not require more than twenty inspectors to take the readings of the meters quarterly, provided they would do half as much as those do who are employed by the gas companies.

When the city of Providence had 4,500 meters in use there was employed by the Department then only two men, who were regularly engaged at that work, one of whom, in addition, acted as collector and examiner of fittings, both of whom would be required if there were no meters in use. During certain seasons of the year a clerk or two from the office is detailed for the work, but it is a merely temporary employment, lasting for a few weeks only. The city of Worcester, with about 4,000 meters in use, had four meter inspectors, but they were not employed especially for that purpose. These men read the meters and examined them once a month. This takes about two weeks. The balance of the time they are employed at other work. It seems that if employed all the time as meter inspectors the services of two would be sufficient. In view of these facts, it is within reason to suppose that twenty men would be enough of a force of meter inspectors for the 65,500 meters placed in New York.

8. The Providence plan, by which a charge is made for every tap and fixture unless the house owner elects to accept and pay for a meter, it being understood that a specified tax shall be paid whether water is used or not, but only the excess of this specified amount to be charged for by measurement, is an admirable one, and cannot very well, in my opinion, be improved upon. If the meter system is to be applied in New York, that would be as good a plan to adopt as any. To my mind, the house owner should be made to purchase the meter, and it should be considered as much a part of the water fittings of a house as a hydrant or any other fixture. Under a law compelling its purchase, the whole question would be greatly simplified, and public officials would be relieved from the charge of originating and fostering a huge job for the purchase of meters with public funds, with which they would assuredly be charged by that irrepressible class of indignant taxpayers who can never be made to understand or believe that public officials are ever induced to advocate salutary measures for the good of the commonwealth without having concealed somewhere a scheme to fleece the public treasury.

In conclusion, let me say that it is a matter of easy demonstration to show that the general application of meters in New York would greatly increase the water revenue, and correspondingly decrease the consumption of water, by putting an end to waste. There is no reason why the experience of Providence and other cities should not be repeated in New York. The same conditions exist and the same remedies are available. Human nature is pretty much the same everywhere. The inhabitants of Providence are similar in habits and customs to those of New York, and what has proved good and beneficial there would have a like effect in the metropolis. It appears somewhat incongruous, however, that we should go to the small New England cities for proper instruction upon this great question of water supply, but so it is nevertheless. Boston has gone through all the varied experiences of New York, and has settled down at last to a firm belief in the efficiency of the meter system. Our transpontive neighbor, the City of Churches, is entering upon a grand scheme to expend half a million dollars to increase the water supply, without any real necessity for doing so. One half the sum invested in meters would settle the question there for an indefinite time. When she gets her additional five or ten million gallons, the annual water famine will come along as usual, with touching regularity. And so it will be until her authorities fall into line with the advanced thought of the day upon the question, and advocate the application of the meter system. And so it must come in New York, sooner or later. When it does, those who have prophesied the result will have abundant satisfaction in knowing that they did not predict in vain.

C. E.

THE SEWERAGE OF BINGHAMTON.

NEW YORK, *May* 4, 1883.

To the Editor of THE SANITARY ENGINEER:

The letter of Col. Waring, in your last issue, in reply to mine in a former one, hardly calls for an answer. He simply reiterates the points of his former letter without giving any additional support.

The valuable article by Prof. Baumeister, which is contained in your last number, gives a further and most lucid justification of the principles I have advocated.

The conclusions of his research are almost identical with those contained in my report to the National Board of Health made several years ago. The same views are held in the main by Mr. Rawlinson and Mr. Lindley, who are quoted by Col. Waring, as though they indorsed his patents. Both of these gentlemen, in conversation with me, in their writings or correspondence, have asserted that the admission of more or less roof water is beneficial to the sewers.

Mr. Rawlinson states his views in a letter to THE SANITARY ENGINEER, a year ago, from which it seems very

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doubtful that he would ever recommend the patented combination. Mr. Lindley has recently designed a separate system for a portion of Elberfeld, Germany, yet he also has not advocated the Memphis patent.

How Col. Waring can call the separate system, as outlined and still indorsed by Mr. Rawlinson and others, a "little better than a makeshift," while he considers his own somewhat a perfect one, is very curious, because the difference between his and the above not patented system may be insignificant, and lies in the absolute exclusion of roof water in his, and its admission in the other, *however small in quantity*, at the heads of sewers, and not even increasing the cost as much as the royalty, and curiously also, because this very admission rather than the exclusion of roof water has always been and still is considered beneficial and desirable by municipal engineers generally, and also by property owners, and is not objected to by sanitarians.

Yours respectfully,

RUDOLPH HERING.

RESERVOIRS AND HEALTH.

MONROE, N. Y., *April* 27, 1883.

To the Editor of THE SANITARY ENGINEER:

If you have occasion to discuss the "Ramapo Project," in a future issue, much interest would be felt in this district in reading your views of the effect on health and value of real estate in localities where many acres of vegetation will be covered with water. Would the fact that the water was constantly flowing from these artificial reservoirs overcome the danger of malaria?

Yours truly, C. T. KNIGHT.

[The question as to what effect the presence of reservoirs of fresh water, in which the water is constantly being changed by drawing off a daily supply, will have upon the healthfulness of the vicinity, is one of much interest, but also one which depends so much upon the circumstances connected with each particular case that it hardly admits of a general answer.

We believe that in the great majority of cases a reservoir can be so constructed as to involve no special danger from malaria. The covering of acres of vegetation with water, to which our correspondent refers, is never necessary, and should never be allowed, for the decay of this vegetation will injure the water, and those who receive it will suffer as well as the inhabitants of the neighborhood.

Very little is known as yet with regard to the transportation of the cause of malaria by means of the water supply, but certainly competent engineers would bear this possibility in mind, and in constructing reservoirs be careful to avoid producing anything like a swamp, on account of those who are to use the water, as well as those who live in the vicinity. It is especially desirable to remove, as completely as possible, all organic matter from the surface which is to be permanently covered with water, and in cases where, to save cost, this has not been done, the results have not been satisfactory.

The precise relations of small collections of water, such as mill ponds, etc., to malaria, are at present by no means agreed upon; and as manufacturing and commercial, as well as sanitary interests are involved in these cases, controversies have arisen in which there has been much clashing of so-called expert testimony. It is a matter which demands scientific investigation, and as this investigation will require several years and the employment of specially skilled chemists, microscopists, etc., and as, moreover, the results of such an investigation will be of the highest value throughout the country, it seems to us that the United States Government should bear the expense, and that the sooner provision is made by Congress for this work the better.]

PLUMBERS' PROFITS.

PHILADELPHIA, *April* 24, 1883.

To the Editor of THE SANITARY ENGINEER:

The letter of Mr. Jno. Worthington in your paper, April 12, embraces more common sense to square inch than all the other answers and replies on the question of "Plumbers' Profits." And if any man in the plumbing and gas fitting business would keep a copy of it in his shop and honestly keep up to its teaching, he would be better off, not only in the opinion of his customers, but in his own; and it would gradually but surely work up every man to its sensible views.

These few lines of his are worth more than all the columns written about material men, and will *compel* them to look to those in the business for their custom.

J. M. WILLIAMS.

LEAD BURNING.

JACKSON, MICH., *April* 29, 1883.

To the Editor of THE SANITARY ENGINEER:

At your request, I sent, as I told you, a few hurried sketches with description of lead burning machines, not for the information of practical burners, but as an item of interest for your readers; but what I said and what I described were correct, as I will here show for the information of good lead burners, as Mr. Charles E. Field would style himself.

If he had been in the habit of doing large work he would not talk of round patches. For instance, if a patch were to be eight feet square, should it be cut round? He very truly says that all the patches on Fig. 5 can be burned on the outside; and right here I wish to ask him how he would proceed with patch *F*, Fig. 5, to dispense with strip and leave sheet uncut, assuming that it is for an 18-inch connection, which is small. This would give a straight cut at bottom of 24 inches. If he is an expert he will answer this without asking any further questions. It will not take him more than a minute to show how he would fit the patch, but it must have a 24-inch horizontal seam at bottom, without using strip or cutting through. He does not seem to understand what I mean "by in use" in reference to this very patch that he is showing so much about by his drawing, or, as he styles it, the better plan.

Now, for those who do not know the term as used by me of making connections with chambers while in use: chambers are large rooms lined with lead for the condensation of sulphuric acid. They are often in sets and have connections from one to another. These connections are made so that they can be changed, as, if one chamber should be laid off for repairs, the connections are lifted out and caps dropped on, thus disconnecting the chamber. When the repairs are done the caps are lifted and the connection put on. My reference to patch *F* is in these words: "*F* is of a kind I have employed in making large connections with chambers while in use." This means while the chambers are full of gas and the inside of the sheet wet with the condensation going on within. Now, the least part of this gas escaping will so tarnish the lead as to make it very difficult to burn. Then if I were to use his better plan I would be smothered in a few minutes, and I spoke of this patch as being something I had used. Now, I challenge Mr. Field to make a drawing that will represent this very connection, as used with the patch as I have said, and which he has seen fit to criticize. His Fig. 2 is the same as *A*, *B*, *C*, *D* and *E* of my description. Patches may be of any shape.

Another thing is the burning of the pipe by cutting through. Supposing the pipe to be of 12-inch diameter, its lower half sunk in brickwork and immovable, how then will he do as he says? All I have shown are practicable and much used in large works.

Now about the oxygen: If he wants to know about it, he can learn by purchasing one of my machines and putting up the money for it, and I will let him have it on trial. If it does not do all that is claimed for it I will forfeit the machine. If it is what I claim, he to acknowledge it in THE SANITARY ENGINEER. If he is anxious to see the work done by this machine he can get samples by express. With this mail I send you a small sample of burning an ordinary seam done by this machine, and if you show it to a burner he can decide whether this work is as good work as by the oxy-hydrogen machine; and, as I said before, I get my oxygen at the point of combustion and not from a hydrogen generator, as he says. He had better lay that old machine on the shelf, and get something more modern, and fully as good, with a great deal less care.

Hoping I have not taken too much of your valuable space, but wishing to hold up my end,

I am yours respectfully,

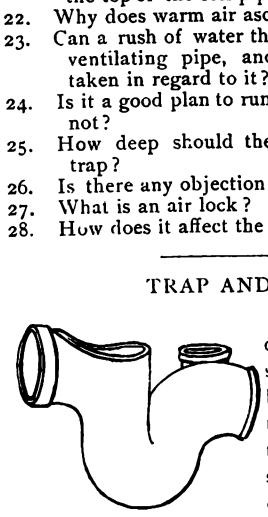
THOS. H. WALKER.

QUESTIONS IN THE PLUMBING COURSE OF THE NEW YORK TRADE SCHOOLS.

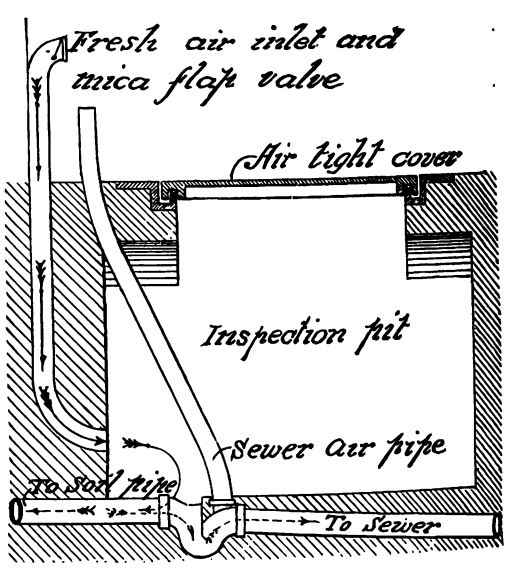
A few weeks since we published the questions which are given to the pupils of the New York Trade Schools on boilers. We now print those on the subject of trapping and ventilating soil-pipes.

1. What is the object of a trap?
2. How is this effected?
3. Is this an effectual remedy?
4. Will the water in a trap absorb gas and emit it again?
5. How is this difficulty overcome?
6. Where should the open end of a pipe be situated, and how is the pipe usually terminated?
7. What is the object of the trap required by the Board of Health where the soil pipe enters the house?
8. Is there any other theory on this point?
9. What is the theory of the Board of Health in regard to this trap?
10. What causes a pressure from the sewers on the main trap?
11. Can the difference in temperature between the air in a sewer and in a soil pipe unseal a trap?
12. Will open fires cause a suction on soil pipes, and why?
13. What is the best form of a trap at the outlet of a soil pipe, and of what material should it be?
14. Why is the momentum of a column of water not likely to carry it through a trap and leave the trap unsealed?
15. What is the effect of a column of water passing through a pipe and completely filling it?
16. Why will a vacuum suck the water out of traps?
17. What is the pressure of the atmosphere on a vacuum?
18. How is this suction prevented?
19. Can a vacuum be created in a pipe when it is only partly filled with water?
20. The Board of Health requires a 4-inch pipe to extend from the outer air to a point just inside the trap by the exterior wall; what is the object of that pipe?
21. Why does the air enter by this pipe and pass out at the top of the soil pipe?
22. Why does warm air ascend?
23. Can a rush of water through the soil pipe affect this ventilating pipe, and should any precaution be taken in regard to it?
24. Is it a good plan to run a soil pipe in a flue, and why not?
25. How deep should the water-seal be in a running trap?
26. Is there any objection to a deep trap?
27. What is an air lock?
28. How does it affect the passage of water?

TRAP AND AIR INLET.



Mr. Francis Botting, of London, sends us the following sketch of a drain trap designed by him, and his manner of setting it. The oblong opening is to facilitate the removal of obstructions. The traps are made of iron.



REGISTRATION OF PLUMBERS.

The following are the rules for the registration of plumbers in San Francisco:

1. A Board of Examiners shall be appointed by the Board of Health, to serve without pay. Shall examine all applicants for registration, as master or journeymen plumbers; and said Board shall consist of the official Inspector of Plumbing, two master plumbers, and two journeymen plumbers; and on the recommendation of said Board certificates of registration only shall be issued.

2. All persons who apply for such registration as master plumbers, shall undergo a theoretical examination as to their ability to have charge of and direct the plumbing and drainage of buildings, and all persons registering as master plumbers, who can give proof that they are practical plumbers, shall, upon passing the same examination as is prescribed for journeymen plumbers, receive a certificate as theoretical and practical master plumbers, and said certificate will enable all master plumbers to employ under their directions, and for whom they are personally responsible, such persons as apprentices, or others employed by them, who, either through lack of skill, of age, or experience, are unable to register as journeyman plumbers; provided, that no person over twenty-five years of age shall be allowed the benefits of this clause.

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3. Journeymen plumbers applying for registration shall undergo an examination as to the practical part of the trade, and state, on a form provided for that purpose, their age, place of residence, where they learned their trade, and with whom, and where now employed; and upon the recommendation of the Board of Examiners, shall be granted a certificate of registration.

4. The Board of Examiners will hold meetings weekly, or whenever notified by the official Inspector of Plumbing, who is hereby made Chairman of said Board.

Food and Drugs.

THE TEA INJUNCTION.

Counsel for Messrs. Purden & Wiggins, the consignees of a portion of the Pingsuey teas, the sale of which was enjoined last week, appeared in court on Monday, the 8th, and asked for two weeks more time to prepare their case. No opposition was made by the attorney for the Health Board, but Judge O'Gorman allowed them one week.

At the auction sale of teas, advertised for this week, we notice that no Pingsueys are offered. Significant fact.

The first lot of tea rejected by the Government Inspector, under the new law forbidding the importation of adulterated or spurious tea, arrived recently from England. It was a lot of 50 boxes of "scented caper." This kind of tea is of the same shape as gunpowder, but unlike it in color, being black, and is scented with "chulan" flowers. Upon examination by a chemist, this particular lot of tea was found to be coated with lead. The object in so covering it is to give the tea a dark, glossy appearance. It was a question whether there was any genuine tea leaf in the lot rejected. It was certain, however, that it was unfit for consumption. We placed a grain of this "scented caper" under a microsope and it looked like a lump of lead.

The Japanese use gypsum, soapstone and a blue coloring matter in manipulating tea. The Chinese use the same articles to color Pingsueys, Tienkis, Fychows and Taipings. Nankin Moyune teas have very little or no coloring matter on them, while Oolong and Congous are not artificially colored. It is claimed that basket-fired Japan, the leaf of which is black, is also free from artificial coloring matter, but of late it has been found that by the use of plumbago a very black, glossy appearance is given to the leaf, which makes it sell at a higher price, as the color pleases the eye of the buyer. Some claim that common Ankoi Oolongs, which are very poor drinking teas, should be excluded, although they are not colored nor always mixed with foreign matter. It is a common opinion that earthy Congous should be excluded. The greatest point in dispute is that covering Pingsuey greens. Some claim that, as the better grades of Pingsueys are not injurious to health, they should be admitted, but that the common kinds should be rejected. No two experts seem to agree as to the dividing line or where the good leaves off and the bad begins.—*The American Grocer.*

VINEGAR IN BOSTON.

Mr. B. F. Davenport, the inspector of vinegar for the city of Boston, has made his report for the year ending March 31, 1883.

Of some 250 or 300 samples purchased of manufacturers and grocers, he finds considerable variation in regard to strength and purity. The following are the results obtained with reference to the amount of acetic acid:

"2.4 per cent. of the samples contained 2 to 2.5 per cent. of the acid; 3.2 per cent. had 2.5 to 3 per cent.; 15.2 per cent. had 3 to 3.5 per cent; 18.8 per cent. had 3.5 to 4 per cent.; 25.6 per cent. had 4 to 4.5 per cent.; 12 per cent. had 4.5 to 5 per cent; 10.8 per cent. had 5 to 5.5 per cent.; 3.2 per cent. had 5.5 to 6 per cent.; 2.8 per cent. had 6 to 6.5 per cent.; 2.4 per cent. had 6.5 to 7 per cent,; 1.2 per cent. had 7 to 7.5 per cent.; 1.6 per cent. had 7.5 to 8 per cent.; 0.4 per cent. had 8 to 8.5 per cent., and 0.4 per cent. had 8.5 to 9 per cent of acetic acid. Thus 77.2 per cent. of the samples fell below the at least 5 per cent. of acid proper to a straight, whole, undiluted cider-vinegar, while only 22.8 per cent. of them reached or surpassed it."

With regard to purity, the report continues:

"No vinegar, however, was found containing free mineral acids, a dangerous amount of metallic impurity, or with much of any of the acrid vegetable substances that have at times been found in vinegars.

"So-called cider vinegars ranged in acid strength all the way from 2.1 to 9 per cent. of acetic acid, and in respect to solid residues from 0.1 to 9.7 per cent."

ADULTERATION IN GERMANY.

The volume of reports from consuls of the United States, published by the Department of State for February 1883, being No. 28 of the series, contains a report by Mr. George C. Tanner, U. S. Consul at Liege, in which it is stated that the business of adulteration is an extensive one in Austria and Germany. He says:

"The science of dilution is carried into everything that is liquid, and adulterations into everything that is solid. Their wines, liquors and beers, their medicines, and even their mineral waters are full of all kinds of concoctions and foreign ingredients, that are dangerous to health.

"Even their woolen goods are adulterated with wool made from rags; the rags are passed through a machine, reconverted into wool, then made into cloth, and largely exported into the United States.

"It is well known, and abundantly proved, that cloth made from such wool retains through all its transformations and rough handling germs of disease and disseminates them broadcast. A German, dying of small-pox, his clothing becomes useless for other purposes than old rags. The adulterations of his cloth do not stop here. They sandwich in with the wool of rags, and a small proportion of pure wool, a new *fiber*, known as cosmos, just brought into use as an adulterant and which is considered by recent investigation to be injurious to health. * * *

"Our flour, when found in these countries, becomes foreign to such an extent as to be beyond recognition.

"Our lard is also doctored in many ways, tallow and horse-fat being the most conspicuous adulterations. If evil consequences follow from such wholesale adulterations (as often happens), there is always a means of escape, and the German loses no time in availing himself of it. He sings out lustily that it is in consequence of American adulterations."

We have quoted enough to prove to any one familiar with the subject, that Mr. Tanner has written a string of absurd rubbish, abusing and vilifying two great nations, because—well, because he thinks it necessary to make reprisals for the prohibition by the German authorities of the entrance of American pork into their dominions.

That the German Government has done a very foolish thing in this legislating against American pork, there is no doubt; but that Mr. Tanner has also done a very foolish thing, in forwarding this tirade, and the State Department in publishing it, is equally certain. He furnishes no evidence as to the truth of his statements, and some of them are certainly false, such for instance, as the preservation of germs of disease in cloth containing shoddy, and his insinuation that the clothing of those dying from small-pox is thus worked over. Adulterations are practiced in Germany as elsewhere; they are rarely injurious to health, as the experience of their numerous and skilled sanitary officials has shown; and the idea of Consul Tanner, that the German people adulterate everything they get from America, largely, in order to raise an outcry against them and to prevent further importations, is simply ludicrous. His letter reminds us of the method of warfare employed by certain small boys, who, having a proper fear and respect for a somewhat larger boy whom they dislike, proceed to make faces at his sister.

Our producers of pork and flour have no need for anxiety as to the action of Germany with regard to these articles of food; if they are cheaper than those produced in Germany, they will either go there, or the Germans will go where they can get them.

A committee on sanitary affairs has been appointed at Trenton, with Dr. Phillips as chairman.

At Wilmington, Del., the mayor has named the following as members of the new board of health: Drs. L. P. Bush and A. H. Grimshaw, physicians; Seth Feaster, business man, and Alfred Gawthrop, plumber. Dr. Willard Springer, port physician, and M. C. Conwell, chief engineer of the surveying Department, were stated to be members *ex-officio* of the board.

Mayor Low, of Brooklyn, has vetoed the resolution permitting the planting of trees in front of the City Hall. Health Commissioner Raymond has condemned 116 wells.

Dr. Charles S. Goodrich, who was health officer of Troy, N. Y., during the cholera epidemic of 1832, died at Brooklyn, recently.

The *Maryland Medical Journal*, beginning with the first number of its tenth volume, May 3, will be issued every week.

NEW YORK WATER WORKS STATISTICS.

At the request of an English correspondent we have obtained the following *data* from Mr Isaac Newton, Chief Engineer of the Croton Aqueduct, and Mr. J. J R. Croes, C.E.

The estimated population of the city at the end of the year 1882 was about 1,280,000, which was the approximate number supplied with water, exclusive of the floating population; annual rate of increase, 26,430.

The service is continuous, supplying approximately 100,000,000 gallons daily. The aqueduct is kept running at its full capacity all the time (*i. e.*, at what is considered its maximum safe capacity), and the daily fluctuations of the distributing reservoir are very slight. Of the above quantity, during the year 1882, an average of 13,648,000 gallons per day was supplied through meters, yielding a revenue (for the year) of $376,099.47.

The expenditures and receipts during the year 1882 were as follows:

EXPENDITURES.

For construction	$1,305,640.78
" maintenance	382,936.07
" Interest on bonds	637,625.00
Total	$2,326,201 85

RECEIPTS.

From consumers, by water rents	$1,722,861.38
" tapping pipes, water meter fund, etc.	31,415.02
" property, by direct tax	1,149,201.09
Total	$2,903,477.49

The following summary of a statement prepared by Mr. Croes shows the total receipts and expenditures of the water works from 1829, when the laying of pipes in the streets for a public water supply began, to the close of 1882:

EXPENDITURES FOR THE NEW YORK WATER SUPPLY FROM 1829 TO 1882.

For construction	$35,017,837 72
" maintenance	5,726,435.07
" interest and discount on bonds	30,897,093.61
Total	$71,641,366.40

SOURCES AND AMOUNTS OF REVENUES OF THE NEW YORK WATER SUPPLY FUND FROM 1829 TO 1882.

From consumers, by water rents	$37,562,670.42
" miscellaneous sources, sales of materials and premium on bonds	674,230 35
" property by direct tax	17,421,615.31
Total	$55,658,516.08

LIVERPOOL CORPORATION WATER WORKS.

LIVERPOOL WATER SUPPLY FOR YEAR ENDING DECEMBER 31, 1882.

Average quantity supplied per day to Liverpool and out-townships:

	Gallons.
From Rivington	11,385,284
From Wells	5,459,071
Total	16,844,355

Average population supplied, 714,057.

Average rate per head per day.

	Gallons.
For domestic, miscellaneous trade, sanitary and public purposes	17.16
Water supply through meter	5.89
Total for all purposes	23.05

WATER DEPARTMENT, MUNICIPAL OFFICES, LIVERPOOL, March, 1883. } J. PARRY.

CHORLEY WATER SUPPLY FOR YEAR ENDING DECEMBER 31, 1882.

Average population supplied, 18,289.

Average rate per head per day.

	Gallons.
For domestic, miscellaneous trade, and public purposes	8.09
For trade supplies through meter	2.95
Total for all purposes	11.04

WATER DEPARTMENT, MUNICPAL OFFICES, LIVERPOOL, March, 1883. } J. PARRY.

TESTING AND STAMPING DEPARTMENT FOR WATER FITTINGS. STATEMENT FOR YEAR ENDING DECEMBER 31, 1882.

Fittings received at Testing Office from manufacturers, dealers and plumbers.

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Total number of fittings received.

Draw-off cocks and stop cocks.	Ball cocks.	Cisterns.	Total.
47,032	6,807	10,356	64,195

Approved and stamped.

Draw-off cocks and stop cocks.	Ball cocks.	Cisterns.	Total.
37,799	5,910	9,733	53,442

Rejected.

Draw-off cocks. and stop cocks.	Ball cocks.	Cisterns.	Total.
9,233	897	623	10,753

Revenue from fees for testings, £724, 1*s.* 6*d.*

Fittings supplied under contract for use of corporation in Liverpool and Chorley.

Received in Testing Office.

Stop cocks.	Ferrules.	Public stand pipes.	Bit and hose cocks.	Valves (Peet & Routledge.)	Total.
8,754	6,511	117	289	6	15,677

Approved and stamped.

Stop cocks.	Ferrules.	Public stand pipes.	Bit and hose cocks.	Valves (Peet & Routledge.)	Total.
6,933	6,184	117	289	6	13,539

Rejected.

Stop cocks.	Ferrules.	Total.
1,821	327	2,148

Total fittings stamped:

For plumbing trade.....53,442
For corporation stock..... 13,329
——66,771

Total fittings rejected:

For plumbing trade.....10,753
For corporation stock 2,348
——13,101

Total..... 79,872

WATER DEPARTMENT,
MUNICIPAL OFFICES,
LIVERPOOL, *March*, 1883. } J. PARRY.

BOSTON CITY ENGINEER'S REPORT.

The City Engineer of Boston has charge of a great variety of work. He superintends the grading of streets, the care and maintenance of 54 bridges within the city limits, supported in whole or in part by the city, and 35 bridges supported by railroad corporations, the maintenance of the water works, the construction of the improved sewerage, and the engineering work connected with the new parks. His report for the year 1882 is a concise statement of the work done on each of these works.

Regarding the water supply, he states that the quantity furnished by the Cochituate and Sudbury Works was 3 per cent. more, and that furnished by the Mystic Works 8½ per cent. less than in the previous year. The total consumption was one per cent. greater than in 1881.

The great work of constructing the intercepting and outfall sewers and the reservoir on Moon Island, from which the sewage is to be discharged just after high water, when the current is setting out of the harbor, has made fair progress. The system is "in condition for use up to and including the point where the sewage is raised high enough to be discharged into the outer harbor, and beyond this point it can probably be put in condition for use within a year."

In the tunnel under Dorchester Bay, an interesting experiment is noted, to determine to what extent the porosity of the brick lining could be destroyed by silting up from outside. Iron pipes had been left in the walls as weep holes for the water, to prevent its washing out fresh mortar. In one section of the tunnel, 800 feet long, these pipes were connected after the completion of the work, with a pipe extending up one shaft, and water containing clay, cement and fine sawdust was pumped in behind the lining. By this means the leakage was reduced from 2,200 to 500 gallons per hour.

An idea of the excellent system of records kept in this department may be had from one remark in the report, which we quote: "The practice has been followed of constantly taking photographs, by the cheap dry plate process, of all points of interest in connection with the contract for the outfall sewer and Moon Island reservoir. These not only furnish an interesting record of the progress of construction and the methods and machinery employed, but may prove of great value as affording indisputable evidence to be used in any possible future disagreement with the contractors concerning the character or condition of the work at any time."

The systematic testing of cement is kept up with excellent results, in compelling dealers to furnish none but a good article. About 38,000 barrels were tested during the year and a number of experimental tests made.

As a comprehensive summary in short space, of the operations of a well managed department, covering a great amount of work, this report is to be commended to city officers who are apt to let their fancy run riot in describing puddle and concrete, forgetting the fact that the best writer is one who uses fewest words to tell his story.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

At the meeting, May 2, arrangements were announced for the St. Paul Convention. A visit will be made to Chicago during the week previous to the Convention. The death of Milton Courtright, Fellow of the Society, was announced. Photographs of a dredge and snag-boat, and of a drilling-scow of peculiar construction, used by J. H. Striedinger, M. Am. Soc., C.E., in the Improvement of the Magdalena River, South America, were presented. The following candidates were elected as members: George H. Benyenberg, Milwaukee, Wis.; J. W. Bishop, St. Paul, Minn.; T. L. Griswold, Lagos, Mexico; Randell Hunt, Fargo, Dakota; F. W. Kimball, Milwaukee, Wis.; C. J. Poetsch, Milwaukee, Wis.; A. H. Scott, Milwaukee, Wis.; D. C. Shepard, St. Paul, Minn.; J. A. Smith, Indianapolis, Ind.; G. H. White, Minneapolis, Minn., as Junior; G. A. Lederle, Bismarck, Dakota.

A paper, by Professor J. A. L. Waddell, M. Am. Soc., C.E., "Suggestions as to the Conditions proper to be required in Highway Bridge Construction," was read by the Secretary, and discussed by Messrs. Cooper, Haight and Macdonald.

THE AMERICAN WATER WORKS ASSOCIATION.

The Third Annual Meeting of this Association will be held in the City of Buffalo, N. Y., May 15, 16 and 17. Reduced rates for the accommodation of members have been secured at the Genesee House, which will be the headquarters of the Association. Papers of general interest will be presented, and at the close an excursion to Niagara Falls is promised.

MEMPHIS.

Some time ago, following an examination into the sewerage of Memphis by a committee from Dubuque, Iowa, reports were circulated about an increase of ill health in Memphis since the sewers were laid. To confute these, Mr. Niles Meriweather, City Engineer of Memphis, has written a letter to Mr. Tschirgi, City Engineer of Dubuque, in which he says it is simply absurd to ascribe any sickness to the sewers, and the health of the city is excellent. We have already discussed this matter at length and shown how unfounded these rumors were.

BALTIMORE PLUMBERS.

BALTIMORE, *May* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

Thinking it might be interesting to some of your readers, and hoping it may be the means of determining some city which has not yet made up their minds to join the National Organization, I thought I would inform you what we have been doing here; we have on the roll sixty-three members, and hope the infection may continue to spread, and at an enthusiastic meeting last Thursday evening the following officers were elected: President, Jno. W. Bechtel, No. 129 Saratoga street; Vice-President, Wm. H. Rothrock, No. 37 Light street; Rec. Sec., James Millar, Jr., No. 85 Richmond street; Financial Sec'y, Peter Kreis, No. 163 W. Fayette street; Treasurer, Geo. Knipp, Nos. 42–44 N. Howard street; Directors, Jno. McCart, No. 84 N. Calvert street; D. B. Foster, No. 39 Clay street; Jas. Healey, cor. Calvert and Centre streets; H. C. Bowman, No. 119 N. Howard street; Jas. A. Thornton, No. 466 Pennsylvania avenue. J. M., JR.

CHICAGO MASTER PLUMBERS.

"The master plumbers of Chicago, at a meeting May 3, President D. J. Rock presiding, selected Grand Army Hall, No. 167 Washington street, as the place of future meetings, and adopted the following minutes:

"The Sanitary Committee would call the attention of the Association to the practice generally in use in regard to foot connections with soil pipes. The turning up of the sewer pipe bend is responsible for one-half of the complaints of sewer air or gas in buildings, the connection being broken off by the settling of the building, action of frost, etc. Remedy: the bend at the foot of the soil pipe should be a continuation of the same, and from the bend iron pipe added in distance, at least, of a length of sewer pipe. A connection made in this manner and resting on the solid earth and securely cemented, will be below the action of frost, rats, etc."

PLUMBING LAW VIOLATIONS.

Twenty-one violations of the plumbing regulations were reported last week to the Health Department of this city by the following inspectors: Elliott, seven; Dickinson, six; Hooper, four; Hollick, two; Eagleson and Hicnbothem one each. Most of the cases were not serious. Among the worst was one sewer connection for four houses (Nos. 125 to 131 Third avenue, owned by Charles A. Buddensick), reported by Eagleson. Cement caulked iron drain was reported by Hollick in a house owned by C. Karst, on the north side of 80th street, between 1st avenue and Avenue A. Five cases were referred to the attorney. No violations of light and ventilation plans were reported.

Novelties.

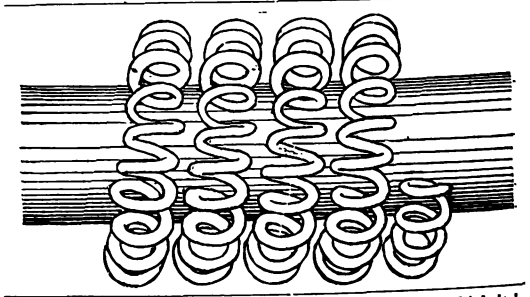
Under this heading we propose to supplement our section on patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

NEW EXTENDED SURFACE RADIATOR.

Our representation illustrates a new departure in extended surface of steam radiators.

It may properly be called *secondary surface*, as it is not a part of the pipe or plain surface, but a detached integral which depends on its conductivity and power to intercept radiant heat from the primary coil which it again communicates to the air.

The pipes of ordinary box coils are wound with spiral turns of No. 12 galvanized iron wire, which has been annealed, with the intention of making close contact at



the greatest number of places on the pipe, and which it is claimed will remain in strong elastic tension around the primary surface.

The inventor claims that he conducted comparative tests on two coils—one eight pipes high and ten pipes wide without wire, and one four pipes high and ten pipes wide with wire—that with air entering the coil chambers at three degrees above zero, Fah., and all other things as nearly equal as he could make them, he delivered air at 160° Fah. from the coil with the secondary surface while the air from the plain coil was only 120°.

He calls the indirect radiators made on this principle "compound coils," and claims more surface in a smaller space than by ordinary methods, and says it is peculiarly adapted for forced circulation of air.

The inventor is Samuel F. Gold, of Englewood, N.J., the inventor of the "Pin Radiators."

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Construction Notes.

COLUMBUS, O.—The following bids for completing the main trunk sewer were received by John Graham, City Engineer, April 30: Northwest sewer; Patrick Maloney, Washington, D. C.—Brick masonry, $11.70 per thousand; excavating, 37¾ cents per cubic yard; pine lumber, $22 per thousand feet; oak lumber, $35; iron man-holes, $7 each. F. Fornof and John Crenane, Columbus—Masonry, $10.83; excavating, 39 cents; pine lumber, $17; oak, $17; man-holes, $8.50. Thomas Connell & Co., Youngstown.—Masonry, $11.33; excavating, 44 cents; pine lumber, $22; oak, $22; man-holes, $15. Columbus Paving Co.—Masonry, $11.25; excavating, 57 cents; pine lumber, $20; oak, $22; man-holes, $16.

Estimate of quantities: 4,944,518 brick, 70,738 cubic yards excavation, 33,910 feet lumber, 14 manhole tops and covers.

NASHVILLE, TENN.—The contract for the 10,000,000 gallon pumping engine has been awarded to the Holly Manufacturing Company at $90,000.

The Holly Manufacturing Company, of Lockport, N. Y., has been awarded the contract by the city of West Bay City, Michigan, for two compound condensing water works pumping engines, each of 1,500,000 gallons daily capacity.

NEW YORK.—At the Board of Education, the contract for erecting a new school building at Avenue A and 119th street was awarded to Joseph Spear at $125,315. The contract for erecting two stairways to Grammar School House No. 11 was awarded to the firm of Mallon & Rourke at $3,144.

NEW YORK.—The contract for the construction of a boiler house (including kitchen, laundry, office, etc. (for the new small-pox hospital on North Brothers Island, was awarded by the Health Commissioners, on the 7th inst., to Mahoney Bros., for $32,250, and $2 per cubic yard for rock excavation.

At the office of the Department of Public Charities and Corrections the contract for the plumbing work and materials for pavilion at almshouse, now in course of erection on Blackwell's Island, was awarded to George Hickenbotham, at $1,430.

A bill has passed the Assembly authorizing the superintendent of public works to construct a reservoir on the Black River, at Forest Port, Oneida county.

ALLEGHENY, PA.—The committee of experts on pumping machinery have reported, recommending the Gaskill pumping engine manufactured by the Holly Manufacturing Company.

HOLYOKE, MASS.—City Engineer Tower has prepared plans for a sewer on Cabot street, 2,000 feet long.

JOLIET, ILL.—The Joliet Water Company was incorporated April 30. Capital $150,000.

NEW BRITAIN, CONN.—In the Connecticut Legislature a bill has passed the Senate authorizing the water commissioners to take streams and land, after appraisal, for the purpose of improving the water facilities of the city.

WILMINGTON, DEL.—The Delaware Legislature has created a Board of Water Commissioners for the City of Wilmington. The three commissioners are named in the bill. The term of office is to be six years, except for those first appointed, one of whom goes out of office every second year. The Board has power to fill vacancies in its own membership for an unexpired term, but "all the members of the Board shall not at any one time belong to the same political party." Heretofore the control of the water works has been in the hands of the City Council.

A Cincinnati man proposes to operate a kind of perpetual motion, by taking the sewage from the hills around the city in pipes to the foot of the hills, there driving turbines with it, and transmitting the power by wire ropes to the top of the hill to work machines for purifying the sewage before it enters the pipes. We suppose that the man who is to tend the machinery will go to the foot of the hill to oil the turbine shaft, and lift himself to the top of the hill by the straps of his boots.

In Memphis, Tenn., between February 1, 1879, and December 1, 1882, there were 10½ miles of streets paved and repaved with block-stone, Telford-Macadam and rubble, 30,800 square yards of wharf paved with stone, and 34½ miles of new sewers built.

The *Trenton State Gazette* has just got hold of M. Durand-Claye's description of the irrigation works at Gennevilieus, and does "not know that it would be wise for Trenton to undertake to adopt this system, at least for the present. *In the first place there is no engineer accessible to us, who understands it sufficiently in detail, to give us a complete plan.*" We were not before aware that access to Trenton, from New York and Boston, was so difficult. Unless we are greatly deceived, there are several engineers in those cities competent to the task.

MADISON, WIS.—The new water works do not seem to be entirely satisfactory. The *State Journal* says that "there is friction at every movement, the contractors fail, and the city authorities seem to lack nerve." The engine foundations have settled, and have to be rebuilt. A partial supply has been obtained, but no considerable portion of the citizens are yet supplied. One well of five-inch bore and 750 feet deep has been bored. A second well was intended to be of eight-inch bore, but "after all sorts of delays, it was bored some two inches less in diameter than was intended, and with this partial failure the contractor packs up his tools and leaves the ranch." The *Journal* adds: "We are willing to stand anything within reason, but such sloppy work as has existed thus far in the matter of our city water works cannot always be endured without a protest."

The Boston Common Council confirmed Mr. William Taylor as Health Commissioner, by a vote of 46 out of 71. In the discussion on the habits of the nominee, Mr. Bromwich said, that "if he suffered from occasional inebriety, he shared the disease with nine-tenths of the members of the Council." This personal appeal to a fellow-feeling settled the matter.

The Boston Common Council have fixed the salaries of the Water Commissioners at $5 for each half day's service, and postponed the confirmation of the new nominees for two weeks, so that they could be brought under this rule, instead of the old one of $3,000 per year. A day's work in the City Hall was stated to be from 10 A.M. to 5 P.M., with an hour out for dinner.

The Selectmen of Bridgewater, Mass., have petitioned the Legislature to prevent the discharge of sewage from the State Normal School into Town River.

One of the Chicago pumping engines having been stopped for repairs, complaints of lack of pressure in the mains are made from all parts of the city. The city engineer tries to impress on consumers the necessity for economy in the use of water.

GOVERNMENT WORK.

Memorandum of bids received and opened on April 28, 1883, by General M. C. Meigs, Supervising Engineer and Architect, for furnishing sixteen cast iron columns for gateway of new Pension Building:

J. M. Duclo, New York	$75.00 each.	
Haugh, Ketcham & Co., Indianapolis, Ind.,	767.68 for all;	$47.97 7/16 each.
Jas. Perrottett, Columbia, Pa	63.00 each.	
Robt. Wetherill & Co., Chester, Pa	78.00 "	
Snead & Co., Louisville, Ky	46.50 "	
Phœnix Iron Co., Trenton, N. J	1,627.00 for all	101.68 7/16 each.
Joseph Hall & Co., Richmond, Va	53.00 each	
Wm. H. Jackson & Co., New York	59.68 "	
J. B. & J. M. Cornell. New York	1,611.00 for all;	101.31 12/16 each.
Cheney & Hewlett, New York	1,056.00 for all;	66.00 each.
Rittenhouse & Son, Morristown, Pa	65.00 each.	
Central Iron Works, Brooklyn, N. Y	40.00 "	
Mitchell & Shepherd, Philadelphia, Pa	70.00 "	
George White & Co., Washington, D. C.	47.00 "	
W. Bollman, Baltimore, Md	55.00 "	
C. A. Schneider & Son, Washington, D.C.	45.41 "	

Custom House, St. Louis, Mo.—Synopsis of bids for iron railing for areas, received under advertisement of April 14, 1883, and opened May 4, 1883:

Christopher & Simpson, St. Louis, $1,614; J. H. Van Dorn, Cleveland, $1,067.72. Knisely Miller, Chicago, $2,088; Snead & Co., Louisville, $1,118: Champion Iron Fence Co., Kenlon, O., $1,213.25; Haugh, Ketcham & Co., Indianapolis, $1,097.60; Ætna Iron Works, Quincy, Ill., $869; Scherpe Koken, St. Louis, $1,600; Stupp Brothers, St. Louis, $1,882.75.

No award yet.

T. Aspinwall & Son inform us their bid for floor tiling for the Custom House and Post Office at Albany was $5 325 not $3,825, as reported by our correspondent.

Pierson & Denike removed from 616 6th Avenue to 600 6th Avenue.

Philip Brady, from 861 to 863 6th Avenue.

Stephen Lane, Jr., from 12 Chambers Street to 951 6th Avenue.

A. Low, from 951 6th Avenue to 823 6th Avenue.

Vaux & Radford, architects and engineers, have removed their offices from 71 Broadway to Rooms 74, 76, 78, Bible House.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Greenwich st, Nos. 228 and 230, br store; cost $15,717; o, Mary C. King; a, Geo. M. Huss; b, G. M. Platt and H. M. Smith & Son.... 46 Pine st, br office building, cost $74,000; o, Com. Union Assur. Co.; a, G. E. Harney; b, D. H. King, Jr....74 and 76 Beach st, br apart h; cost $24,000; o, William Rhinelander; b. F. Bloodgood and J. C. Doremus.... Broadway, n w cor 35th st, br. theatre; o, Hyde & Behman; a, John Sexton....Madison av, e s, 50.5; s 58th st, brown st dwel; cost $30,000; o, Julia Valentine; a, Thom & Wilson; b, Sinclair & Wills.....Madison av, e s, 75.5 s 58th st, brown st dwel; cost $30,000; o, R. H. L. Townsend; a, Thom & Wilson; b, G. Culgin and Sinclair & Wills ...316 E. 40th st, br tenem't; cost, $15,000; o, Joseph and Robert Gordon; a, A. Wagner; b, Gordon Bros.. .42d st, n s, 218 e 1st av, br dwel; cost $3,000; o, Wilson & Adams; a, and b, Chas. Graham & Sons....88th st, s s, 107.9 e of 4th av, brown st apart h; cost $18,000; o, Morris Keller; a, Chas. Baxter....106th st, s s, 100 w Lexington av, br and terra cotta church; cost $80,000; o, Rev. W. P. Flannelly....121st st, n s, 125 n 2d av, three br. dwel; cost each $16,000; o, Michael Fay; a J H. Valentine....62d st, s s, 150 e 2d av, two br tenem's; cost, each $14,000; o, Morris Steinhart; a, B. Ogden....Av A, s w cor 82d st, br tenement; cost $26,000; o. Susan A. Wright; a, Cleverdon & Putzel. .. Madison av, s e cor 87th st, six brown st dwel; cost $25,000 and $15,000; o, J. Macdonald; a, J. Brandt....97th st, n s, 100 w 3d av, five brown st tenem't; cost each $18,000 and $15,000; o, Simon Habermann; a, J. Brandt.... 285 and 287 60th st, n s, 325 11th av, two br tenem'ts; cost each about $9,000; o, Mrs. M. J. Largan; a, G. W. Prodgers; m, J. Mallon & Sons; c, not selected... Manhattan st, n s, 98 e 10th av, two br tenem'ts; cost, each $15,000; o, Peter McCormick; a, J. H. Valentine ....34 to 56 W. 130th st, twelve br dwel; cost $11,000 each; o, Wm. Astor; b, Jas. Webb & Son and John Downey ...146th st, s s, 200 e 10th av, five fr dwel; cost each $2,350; o, Alexander Frazer; a, W. H. Berrin....142d st, s s, 61 e Ryder av, fr tenem't; cost $6,000; o, Mary Wilson; a and b, Geo. T. Campbell....Decatur av, n e cor Suburb av, four fr dwel; cost each $3,000; o, Chas. Hedden; b, J. Richardson.

BROOKLYN.

Dean st, s s, 200 e Washington av, two br tenements; cost each $5,000; o, Thos. Monahan; a, I. D. Reynolds; b, Thos. Donnelly.... Reid av, w s, 24 n Quincy st, eight brown stone dwel; cost each $4,800; o, H. Batterman; a, A. W. Dickie; b, Burroughs & C. L. Johnson..... Reid av, n w cor Quincy st, brown stone dwel; cost $7,000; o, etc., same as last....5th st, n s, 212 e 5th av, four brown st dwel; cost each $5,000; o, and b, P. Mullady; a, Parfitt Bros.... Van Buren st, s s, 24 w Sumner av, six brown stone dwel; cost each $5,000; o, and b, Patrick Concannon; a, I. D. Reynolds....Van Buren st, s w cor Sumner av, brown st flats; cost $10,000; o, and b, Patrick Concannon; a, I. D. Reynolds....Halsey street, s s, 240 e Lewis av, three brick dwel; cost each $5,550; o, L. N. Nichols.... Meserole av, s e cor Newell st, fr tenem't; cost $5,000; o, James Burke; a, F. Weber; b, John Fallon....Franklin av. w s, 100 n Greene av, brown st dwel; cost $5,500; o. and c, Myron C. Rush; a, George P. Chappel; m, Cornelius King....384 and 386 McDonough st, s s, 170 e Stuyvesant av, brown st and br orphan asylum; o, Hebrew Orphan Asy. Soc; a Theobald Engelhard; b, U. Maurer and C. L. Johnson....Judge st, e s, n 132 Powers st, fr tenem't; cost $5,800; o, Gabriel Gengler; a, George Hillenbrand; b, Wm. Bayer and Chr. Wieber.

ALTERATIONS, NEW YORK CITY.

7 E. 32d st, br extention; cost $20,000; a, D. and J. Jardine....243 E. 25th st; cost $5,000; o, Sophia Steins; a, Thos. F. Houghton ..61 W. 36th st, br extension; cost $8,000; o, Francis Hitchcock; a, McKim, Mead & White; b, J. C Miller ...5, 7 and 9 Jacob st, br extension; cost $5,000; o, David Moffatt; a, J. C. Cady & Co.; b, W. and T. Lamb, Jr....4 W. 47th st, br extension; cost $3,000; o, Meeker & Hedden; a, and b, J. Richardson ...Fulton av, w s, 127 s 170th st, br extension; cost $2,500; o. Caroline Zeltner; a, J. Kastner....20 and 22 E. 75th st, br extension; cost $5,000; o, William S. Maddock; superin. Maclays & Davies; b, not selected....23 Ludow st, br extension; cost $4,500; o, Harris Baum; a, W. Graul ..Broadway, w s cor 49th st. br extension; cost, $2,700; o, J. Watts De Peyster; a, Thos J. Drummond; b, R. Drummond & Son....70th st, s s, 20 w Madison av, br extension; cost $10,000; o, Stephen Barker; a, G. A. Schellinger.... Wall st. n w cor Front st, interior alteration; cost $5,000; o, Ellen S. Auchmuty; a, H. J. Hardenburgh; b; J. L. Hamilton....59 E. 66 st, br extension; cost $5,000; o, Wm. Hoyt; a, W. B. Tubby; b, W. and T. Lamb, Jr.

ALTERATIONS, BROOKLYN.

437 Manhattan av, interior alterations, fr extension; cost $5,000; o, George Bullwinkle; a, F. Weber; b, M. Vogel and H. Eggers....75 State st, br extension; cost $9,000; o, Mrs. C. Gilmore; a and b, H. D. & W. A. Southard.

BALTIMORE, MD.—Hoffman st, n s, br bldg; o, Mary A. Albert.... Balton n. w. cor Wilson, br bldg; o and b, E. E. Shipley.... Paterson Park ave, e s, br bldg; 2 story back bldg; o and b, Geo. Russell....Orleans, s s, No. 401, br, bldg; o, Solomon Seward.... W. Balto, No. 311, br warehouse; o, Geo Reineker....Sharpe, w s, br bldg; o and b, Geo. Kahl....Elliott st, No. 174, br bldg; o and b, Valentine Geis. ....Central ave, cor Alianna, br public house; o and b, J. F. Adams.....Gilmor, s w cor Franklin, br bldg; 2 S stable; o, W. W. Lindsey....Lafayette ave, n s, 3 br bldgs; 2 S back bldgs; o and b, J. H. Carter....Sharp, s w cor Lombard, br bank with basement; o, People's bank....Charles, w s, 6 br bldgs; 2 S back bldgs; o and b, C. W. Kudel....Chase, n e cor Gitz ave, 5 br bldgs, 2 S back bldgs, o and b, J. W. Gitz .....Greenmount ave, e s, 2 br bldgs; 2 S br bldgs; o and b, J. Cardon....Harrison, e s, br bldg; 2 S back bldgs; o, Emil Wagner....Preston, n s, 9 br bldgs; mansard roof; o and b, A. L Garor....Chester, e s, No. 131 br, bldg; o, Jno. McDonough.... Chester, e s, No. 129, br bldg; o, Hy. Plummer.

BOSTON, MASS.—253 Marlboro st, 1 br dwel; o, G. T. Bailey; b, Watson & Shepard....63-65 Chelsea st, 1 br family hotel; o, Patrick Riodan....67 Chelsea st, 1 br dwel and store; o, Patrick Riodan ....138-140 Newburg st, 2 br dwel; o, Alden Avery; b, Alden Avery....Garrison nr Botalph st, 1 br mechanical; o, Mass. Ins. Technology....717-719 Parker st, block of 2 fr dwel; o, Wm. Goldsmith; b, Sam'l Rautin....Farrington av, 2 block 2 each, fr dwel; o, Jesse Tirrell; b, H. M. Perry....Cedar st off Green st, 1 fr dwel; o, Mary McMorrow; b, J. B. McKay....73 Pearl st, 1 fr dwel; o, J. H. Tomfarhide; b, J. B. Maynard..Virginia st cor Davenport av, 1 fr dwel; o, L. F. Fosdick...Colbert st nr Norfolk st, fr dwel; o, Sam'l B. Pierce; b, W. J. Jobbling....45-47 W 4th st, bl of 2, fr dwel and store; o, Jas. N. Devine; b, Jas. N. Devine.... Forest av, fr dwel; o, L. F. Taip; b, J. W. Allbright.. .Center st nr Lamarline st, block of 2 fr dwel; o, Wm. Magee; b, Jas. Cook....Melville st nr Waldeck st, 1 fr dwel; o, Julius Pratt; b, Chas. Maynad... 86-88 Tremont st, block of 2 fr dwel; o, P. J. Nory; b, John Noyes.. .Regent st nr Dale st, block of 2 fr dwel; o, John P. Santry; b, A. P. Anderson.... Bearse st nr Butler st; 1 fr dwel; o, H. S. Healy; b, Jas. A. Healy....Tremont av cor Whitney st, 1 fr dwel; o, Dennis Daly; b, McDonald & Tobin ...Adams nr Mills st, 1 fr dwel; o, J. W. Hildreth; b, J. W. Hildreth....Walnut av cor Cobden st, 1 fr dwel; o, Leonard Ware, Jr.

(Continued on page 542.)

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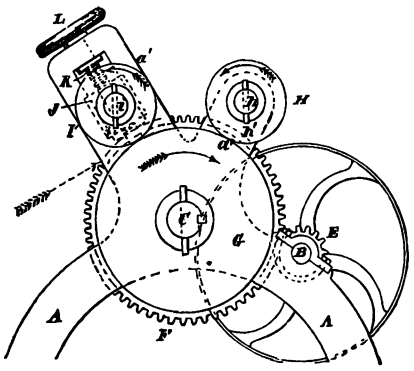
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

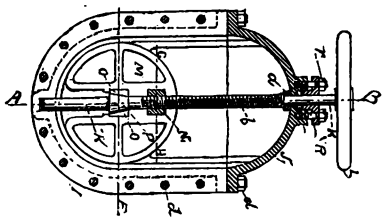
[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

269,131. MACHINE FOR BENDING GAS PIPE, etc. JOSIAH C. SPRING, St. Louis, Mo. Filed Feb. 28, 1882. (No model.) Issued Dec. 12, 1882.



Claim.—The frame A, having projections *a* a^1, shafts B C, pulley D, pinion E, wheel F, grooved rollers G H I, arbors *h i*, adjustable block J, screw rod K, and hand wheel L, all arranged substantially as and for the purpose set forth.

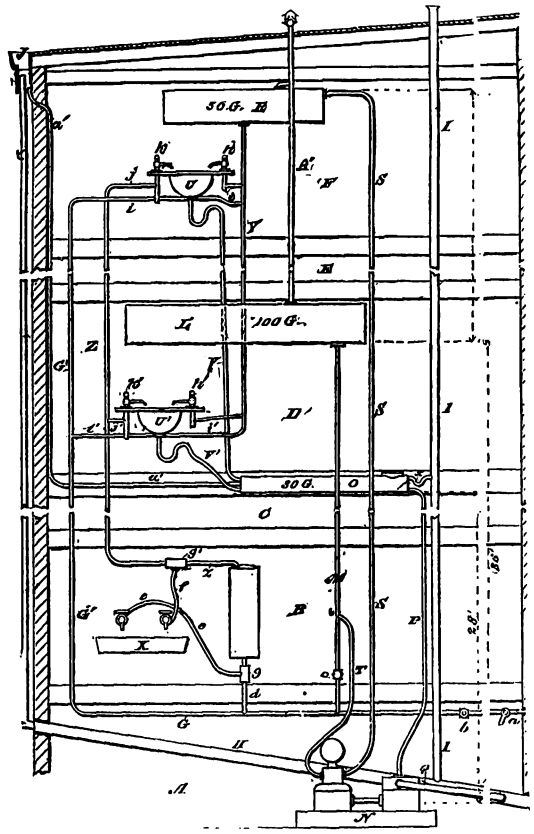
269,138. STOP OR GATE VALVE. FRANCIS H. TREAT, Joliet, Ill. Filed Dec. 27, 1881. (No model.) Issued Dec. 12, 1882.



Claim.—In stop or gate valves in which the gates consist of disks which move loosely across the pipe opening, the valve or operating stem provided with cone P, in combination with the disks M, provided with contact or saddle pieces O, the whole operating to force said disks to a tight bearing upon their seats, substantially as set forth.

269,156. MEANS FOR SUPPLYING WATER TO HOUSES. ANDREW CAMPBELL, Brooklyn, N. Y. Filed April 10, 1882. (No model.) Issued Dec. 12, 1882.

Brief.—Water rises in reservoir L through pipe G by the pressure in the main. The waste water from the basins is collected in reservoir O, and is used to operate a pump, N. This pump draws water from reservoir L through pipes M and T and forces it into reservoir R through pipe S. When the basin cock *k* is turned (see Fig. 4) hot



water is forced from boiler W by the pressure in reservoir R through pipes *i*, G^1, *d* and Z, the channel w^1 (Fig. 4) uniting the two parts of pipe i^1. When basin cock k^1 is turned the same result is obtained through pipe i^1. When the cock is turned for hot water the automatic valves *g* and g^1, Fig. 2, rise and close the pipes *e f*, which admit water into the kitchen, thus allowing the water to rise in pipe Z.

Claim.—1. As a means for raising water to an elevated reservoir or point above the level of the water supply, a storage reservoir of fountain head, a pump arranged to receive water from the storage reservoir or fountain head and to force it up to the elevated reservoir, and a motor engine to drive the pump, arranged to receive and be operated by a head of waste water from above the fountain head, substantially as set forth.

2. As a means for raising water in houses to a higher level than is due to the pressure in the main, the combination of a storage reservoir, L, connected with the service pipe, a pump supplied from said reservoir, a supply reservoir, R, connected with and arranged to be supplied by the pump, a waste reservoir, O, and a water motor supplied from reservoir O, and arranged to drive the pump, said reservoir O being arranged at a greater height above the motor than the reservoir R is above the reservoir L, substantially as set forth.

3. The means for supplying hot water to the upper floors of a building, which consists of an elevated supply reservoir arranged above the level due to the pressure or head in the main, the service pipe provided with the check valve, a pipe connecting said reservoir with the service pipe beyond the check valve, a boiler arranged to receive water from the service pipe beyond the check valve, a hot water pipe from the boiler to the cock, and said cock arranged below the supply reservoir, all combined and arranged substantially as set forth.

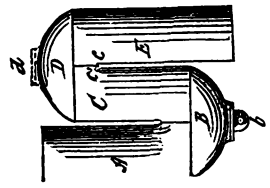
4. The means for cutting off the supply of water in the kitchen when hot water is being drawn on the floors above, which consists of an elevated supply reservoir, the service pipe provided with a check valve, a pipe to connect the service pipe with said reservoir, a boiler arranged to receive water from the service pipe beyond the check valve, a hot water pipe from the boiler to the cock on the upper floor, the said cock, an automatic cut-off, constructed substantially as described, arranged in the hot water pipe, and arranged to cut off the supply of hot and cold water to the kitchen when communication is established between the supply reservoir and the main, and means for cutting off and establishing at will such communication, all combined and arranged substantially as set forth.

5. The combination, with the elevated supply reservoir connected with the service pipe, of the said service pipe provided with a check valve, the boiler connected with the service pipe beyond the check valve therein, the hot water pipe from the boiler to a cock and having fixed in it an automatic cut-off, constructed to operate as described, and the hot water cock constructed and arranged to open communication between the boiler and the elevated reservoir simultaneously with the turning on of the hot water, substantially as set forth.

6. The hot water cock comprising stem *u*, nozzle u^1, and plug *v*, said plug being provided with the hot water channel *w* and the cross channel or bore w^1, in combination with the hot water branch pipe *j* and the cold water branch pipe *i*, all constructed and arranged to operate substantially as and for the purposes set forth.

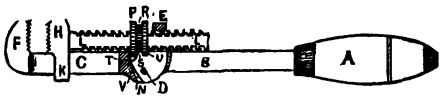
7. The automatic cut-off, comprising the barrel *l*, having a lateral branch, *e*, and an enlargement, l^1, the cylinder *n*, coupled to the piston *p*, and said piston provided with a guide stem and spring, all constructed, combined and arranged to operate substantially as set forth.

269,177. LEAD TRAP OR CESSPOOL. ALEXANDER CHAPMAN, Montreal, Quebec, Canada. Filed Aug. 9. 1882. (No model.) Issued Dec. 19, 1882.



Claim.—A lead trap made up of separate inlet, intermediate, and discharge pipes, and separate caps covering the bends, their meeting edges being joined together edge to edge without overlapping, and joined lead to lead without solder, substantially in the manner and for the purpose set forth.

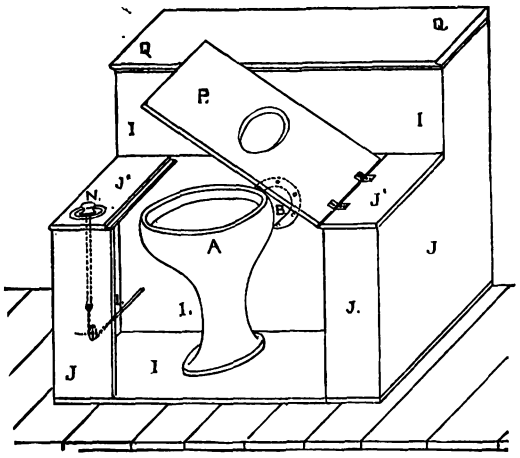
269,234. PIPE-WRENCH. EDWIN A. ROBBINS, Boston, Mass. Filed Oct. 2, 1882. (No model.) Filed Dec. 19, 1882.



Claim.—1. The combination, with the stationary jaw F, having bar C, adjustable jaw H, having screw-threaded shank L, and adjusting-nut P, of the fulcrumed lever-handle connected with the periphery of the said adjusting-nut, so as to actuate the said adjustable jaw toward and from the stationary jaw by movement of said handle, substantially as described, as and for the surposes set forth.

2. The combination, with the stationary jaw F, bar C, adjustable jaw H, shank L, and adjusting-nut P, of the fulcrumed lever-bar B, provided with the hook S and shoulder U, and stops, substantially as described, as and for the purposes set forth.

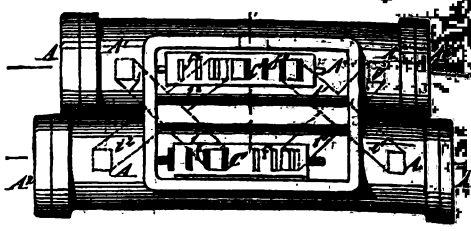
269,246. PORTABLE WATER CLOSET. GEORGE E. WARING, JR., Newport, R. I., assignor to the Drainage Construction Company, Boston, Mass. Filed Apr. 17, 1882. (No model.) Issued Dec. 19, 1882.



Claim.—As a new article of manufacture, a portable water closet consisting of a bowl or hopper, a finished floor, seat and casing, ready to be connected to the water supply and waste pipes without the aid of a carpenter.

269,260. WATER AND STEAM METER. AUGUST C. CHRISTENSEN, Brooklyn, N. Y. Filed July 20, 1882. (No model.) Issued Dec. 19, 1882.

Claim.—The combination of an inclosing-casing having a chest at the upper part and diagonal channels at the lower part, reciprocatory plungers or pistons having channels forming slide valves, and valves resting loosely on said plungers and operated by contact with the casing, substantially as described.



2. In a water and steam meter, the combination of an inclosing-casing having a chest at the upper part and two sets of diagonal channels crossing each other at the lower part, two reciprocatory plungers or pistons having channels which form slide-valves, two double gridiron slide valves having curved under faces resting on said plungers and communicating with openings therein, one-half the openings to each gridiron-valve being closed while the other half is open, substantially as described.

269,047. HEATER ATTACHMENT FOR STOVES. NAMAN J. GRAHAM, Jackson, Ohio. Filed July 29, 1882. (No model.) Issued December 12, 1882.

269,083. VAPOR BURNER. THOMAS D. MCCORMICK, Clinton, Ohio. Filed August 14, 1882. (No model.) Issued December 12, 1882.

269,085. CONDUIT FOR ELECTRICAL CONDUCTORS. JOHN K. MCLAUGHLIN, Philadelphia, Pa., assignor of one-half to Lewis H. Taylor, Jr., same place. Filed January 27, 1882. (No model.) Issued December 12, 1882.

269,086. CONDUIT FOR ELECTRICAL CONDUCTORS. JOHN K. MCLAUGHLIN, Philadelphia, Pa., assignor of one-half to Lewis H. Taylor, Jr., same place. Filed January 27, 1882. (No model.) Issued December 12, 1882.

269,087. APPARATUS FOR REGULATING THE SUPPLY OF GAS. JOHN MCLENNAN, 84 Finsbury Park Road, and RICHARD OWEN, England Lane, Haverstock Hill, County of Middlesex, England. Filed December 10, 1881. (No model.) Patented in England, March 11, 1880, No. 1,055. Issued December 12, 1882.

269,114. STEAM BOILER. GARRIE H. RHEUTAN, Hartford, Conn. Filed June 6, 1882. (Model.) Issued December 12, 1882.

269,115. FIRE GRATE. PHILIP RICHARDS, Wilkes-Barre, Pa. Filed October 24, 1882. (No model.) Issued December 12, 1882.

269,145. MEDICAL COMPOUND. JOHN S. H. WHEATON, Crisfield, Md. Filed Oct. 18, 1882. (No specimens.) Issued Dec. 12, 1882.

269,162. PROCESS OF AND APPARATUS FOR MANUFACTURING GAS. HENRY M. PIERSON, Brooklyn, N. Y., and JAMES S. PIERSON, Plainfield, N. J. Filed June 28, 1882. (No model.) Issued Dec. 12, 1882.

269,168. GAS ENGINE. KARL TEICHMANN, Stuttgart, Wurtemberg, Germany. Filed Aug. 14, 1882. (No model.) Patented in England April 28, 1882, No. 2,008; in France April 28, 1882, No. 148,644; in Belgium April 28, 1882, No. 57,745; in Italy April 28, 1882, XVI., 14,148 and XXVIII., 168; in Luxemburg, May 1, 1882, No. 198, and in Austria-Hungary July 7, 1882, No. 1,200 and No. 1,202. Issued Dec. 12, 1882.

269,179. GALVANIC BATTERY. EDWARD M. COINTEPAS, Boston, assignor, by mesne assignments, to Charles H. Ward, Cambridge, Mass. Filed Jan. 20, 1882. (No model.) Issued Dec. 19, 1882.

269,180. FIRE ESCAPE. LEWIS COLLER, Flint, Mich. Filed Sept. 11, 1882. (No model.) Issued Dec. 19, 1882.

269,189. APPARATUS FOR HEATING FREIGHT CARS. WILLIAM E. EASTMAN, Boston, Mass., assignor to the American Freight Car Heating Company, Portland, Me. Filed Aug. 4, 1882. (No model.) Issued Dec. 19, 1882.

269,197 to 269,205. AUTOMATIC FIRE EXTINGUISHERS. FREDERICK GRINNELL, Providence, R. I. Filed Feb. 20, 1882. (No model.) Issued Dec. 19, 1882.

269,217 HOSE NOZZLE. PEARL C. LEWIS, Catskill, N. Y. Filed July 26, 1882. (No model.) Issued Dec. 19, 1882.

269,223. OUTLET FOR TANKS OF STEAM HEATING APPARATUS. EUGENE F. OSBORNE, St. Paul, Minn. Filed Apr. 3, 1882. (No model.) Issued Dec. 19, 1882.

299,224. STEAM PIPING FOR BUILDINGS. EUGENE F. OSBORNE, St. Paul, Minn. Filed Apr. 3, 1882. (No model.) Issued Dec. 19, 1882.

269,236. VENTILATING DEVICE. SUMNER SHAW, Boston, Mass. Filed Apr. 15, 1882. (No model.) Issued Dec. 19, 1882.

269,239. PROCESS OF TREATING INCANDESCENTS. MARMADUKE M. M. SLATTERY, New York, N.Y., assignor to the Slattery Incandescent Lamp Company, same place. Filed Mar. 6, 1882. (No model.) Issued Dec. 19, 1882.

269,241. LAMP-LIGHTER. EDWARD B. SMITH, Richland, Mich., assignor of one-half to Patrick H. Gilkey, same place. Filed Oct. 27, 1882. (No model.) Issued Dec. 19, 1882.

269,243. FEED-WATER HEATER. DANIEL C. STILLSON, Somerville, Mass. Filed Aug. 24, 1882. (No model.) Issued Dec. 19, 1882.

269,244. TUBULAR WELL. RANSOM E. STRAIT, Galesburg, Mich. Filed Dec. 5, 1881. (No model.) Issued Dec. 19, 1882.

269,267. GASOLINE-BURNER ATTACHMENT FOR COOK STOVES. DUANE T. DAVIS, PANA, ILL. Filed Oct. 20, 1882. (No model.) Issued Dec. 19, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING APRIL 28th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough
NORTH ATLANTIC CITIES.																								
Portland	Maine	34,519	10	15.0	3	30.0			3								1							
Boston	Mass	407,581	193	24.6	61	31.6	7	1	34	3	6	5	1	3		5	34		12		4	2		
Cambridge	Mass	57,432	16	14.4	7	43.7			3	1		1	2				1		1					
Worcester	Mass	64,995	27	21.6	6	22.2			2		1		1				7	1	3			2		
New Haven	Conn	66,979	20	15.5	8	40.0			5			1			1	1			1					1
Providence	R. I.	116,755	48	21.4	6	12.5	1		9					7			5		1			3		
Total		748,261	314	21.8	91	28.9	8	1	56	4	7	7	4	10	1	6	48	1	18		4	7		1
EASTERN CITIES.																								
Albany	New York	98,430	32	17.0	10	31.2			4				1			2	3							
New York	New York	1,299,249	630	25.2	240	38.0	22	3	105	10	18	12	4	2	10	23	86		36		21	12	1	11
Brooklyn	New York	633,763	263	21.5	94	35.7			39	9	1	15	1	1	4	15	36	2	17	3		3		7
Hudson Co.	New Jersey	228,025	90	20.5	21	23.3	5	2	15	2		1		4	3	6	16		2	1		4		
*Newark	New Jersey																							
Camden	New Jersey	54,012	18	17.3	1	5 5			4		1			2	1		2	1	2					
Paterson	New Jersey	58,324	26	23.1	4	15.3			6								2		1					
Philadelphia	Pa.	907,043	378	21.6	114	30.1	1	1	65	9		18	1	8	6	9	27	8	11				5	2
*Reading	Pa.																							
Wilmington	Delaware	46,889	18	19.9	4	22.2	1		2		1						4						1	
Total		3,325,735	1,455	22.7	488	33.5	29	6	240	30	21	46	7	17	24	55	176	11	69	4	21	19	7	20
LAKE CITIES.																								
Buffalo	New York	168,702	52	16 0	25	48.0	3	1	5		1	2	4		1	5	6		2				1	
Rochester	New York	92,116	24	13.5	7	29.1		1	7								1		2		1	1		
*Syracuse	New York																							
Cleveland	Ohio	192.084	44	11.9			2	1	6	1	3	2					2	1						
Detroit	Michigan	131,118	63	25.0	24	38.0		1	13	1		8	1		1	1	15	1	2		1			
*Chicago	Illinois																							
Milwaukee	Wisconsin	135,233	52	20 0	22	42.3	2	1	9			2		1		3	1	1			1	1		1
Total		719,253	235	16.9	78	33 1	7	5	40	2	4	14	5	1	2	9	25	3	6		3	2	1	1
RIVER CITIES.																								
*Allegheny	Pa.																							
Pittsburgh	Pa.	191,523	69	18.7	25	36.2	7	3	5					1			13		2	1				5
Cincinnati	Ohio	267,767	86	16.7	29	33.7	4		14	1	2	1	1	2		2	10		2	1	1	1		
Dayton	Ohio	41,648	17	21.2	5	29 4	3		5							1	1						1	
*Louisville	Ky.																							
Indianapolis	Indiana	86,529	27	16.2	5	18.5	1		11				1				1		1					
*Terre Haute	Indiana																							
Minneapolis	Minn	98,026	32	16.9	15	46.8	1	3	3		2	2	1				5					1		
*St. Paul	Minn																							
St. Louis	Mo.	362,816	153	21 9	62	40.5	6	2	28	2	2	10		4	6	6	13		4				8	3
Total		1,048,309	384	19.0	141	36.7	22	8	66	3	6	13	3	7	6	9	43		9	2	1	2	9	8
PACIFIC CITIES.																								
*San Francisco	Cal.																							
SOUTHERN CITIES.																								
District of Columbia	Wh.	136,471	51	19.4	15	29.4	1	1	5	1	1				1	2	3	1						
" "	Col.	71,103	35	25.6	17	48.5			6			1		1		1	6		2					1
Richmond,	Va. Wh.	38,526	16	21.6	2	12.5			3		2			2			1							
"	Col.	29,394	9	15.9	4	44.4			1															
Charleston	S. C. Wh.	22,699	9	20.6	1	11.1																		
"	Col.	27,595	16	30.1	5	31.2																		
Atlanta	Ga. Wh.	25,583	6	12.1					1		1						1							
"	Col.	19,221	9	24.3	6	66.6	1										3				1			
*Savannah	Ga. Wh.																							
"	Col.																							
Nashville	Tenn. Wh.	31,993	13	21.1	4	30.7			2						1	1							2	1
"	Col.	19,406	7	18.7	4	57 1											2				1			
Memphis	Tenn Wh.	18,677	12	33.4	4	33.3	1		1		2						1							
"	Col.	14,890	5	17.4	2	40.0			1								1			1				
*Mobile	Ala. Wh.																							
"	Col.																							
New Orleans	La. Wh.	163,757	85	27.0	29	34.1	5		6		8	1			3		7		2				17	
" "	Col.	59,806	70	60.4	18	25.7	2		9						4		1					1	28	
Total White		437,706	192	22.8	55	28.6	7	1	18	1	14	1		2	5	3	13	1	2				19	1
Total Colored		241,481	151	32.5	56	37.0	3		17			1		1	4	1	13		2	1	2	1	28	1
Total in 32 U. S. Cities		6,520,745	2,731	21.7	909	33.2	75	21	437	40	52	82	19	38	42	83	318	16	106	7	31	31	64	32
Total for four weeks, ending April 28.		5,933,398	10,794	23.5	3,704	34.3	265	89	1,615	177	157	276	74	187	106	335	1,365	78	475	22	141	123	165	106
April 14—Total in 28 English Cities		8,620,975	4,085	24.7			138				29	27		57		63					89		4	108
April 14, " 8 Scotch Cities		1,233,088	662	27.9			17				14	12		8		9			162		21		1	47
" " Irish Cities																								
Mar. 24, " 171 German Cities		8,640,665	4,635	27.9	1996		90		690	30	158	189		39		73			702		74	26	10	64
Mar. 31, " 170 " "		8,713,054	4,782	28.5	1929		93		802	23	152	142		52		53			776		91	14	4	85

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

Notes and Abstracts.

Of an urban population of 6,520,745 there died during the week ending April 28, 2,668 persons, which is equivalent to an annual death rate of 21.7, a decided decrease from the preceding week for which it was 24.2.

For the North Atlantic cities the rate was 21.8; for the Eastern cities 22.7; for the Lake cities 16.9; for the River cities 19.0; and in the Southern cities, for the whites 22.8, and for the colored 32.5 per 1,000.

Of the whole number of deaths 33.2 per cent. were under five years of age, the proportion being highest in the River cities (36.7) and among the Southern colored (37.0).

Accidents caused 2.7 per cent. of all deaths.

Consumption caused 16 per cent. of all deaths. In the North Atlantic cities it caused 17.8; in the Eastern cities 16.4; in the Lake cities 17.0; in the River cities 17.1, and in the Southern cities, for the whites 9.3, and for the colored 11.2 per cent.

Croup caused 1.4; diarrhœal diseases 1.9; and diphtheria 3.0 per cent. of all deaths. In the North Atlantic cities diphtheria caused 2.2; in the Eastern cities 3.1; in the Lake cities 5.9; in the River cities 3.3, and in the Southern cities, for whites .5 and for the colored .6 per cent.

Typhoid fever caused 1.3 per cent. of all deaths, the highest rate from this cause being in the North Atlantic cities, 3.1 per cent. Malarial fevers caused 1.5, and scarlet fever 3.0 per cent. of all deaths.

Pneumonia caused 11.6, and acute bronchitis 3.8 per cent. of all deaths. In the North Atlantic cities pneumonia caused 15.2; in the Eastern cities 12.0; in the Lake cities 10.6; in the River cities 11.1,

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and in the Southern cities, among the whites, 6.7, and among the colored 8.6 per cent. Measles caused 1.1, puerperal diseases 1.1, small-pox 2.3, and whooping cough 1.1 per cent. of all deaths.

DETROIT, MICH.—Dr. O. W. Wight reports 30 new cases of diphtheria and seven of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 28 new cases of scarlet fever and four of diphtheria, making 53 cases of the former disease and 16 of the latter on hand April 28.

FRANKLIN, MASS.—Postmaster J. A. Woodward reports the prevalence of mumps during the month of April; with this exception the health of the section was good.

BOSTON, MASS.—C. E. Davis, Jr., reports 39 new cases of diphtheria, 33 of scarlet fever, and nine of typhoid fever.

LYNCHBURG, VA.—Dr. Thos. L. Walker reports the city as free from small-pox.

PITTSBURGH, PA.—Dr. W. Snively reports one case of small-pox.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths during the week, two of which were of children under five years of age. Cerebro-spinal meningitis is reported as having caused two of the deaths.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports 1,363 insane patients remaining under treatment April 28. During the week which ended on that day, there were nine admissions, two discharges, and four deaths.

PROVIDENCE, R. I.—Dr. E. M. Snow states in his report for the week that "the mortality last week was only slightly above the annual weekly average, and is decreasing. The new cases of typhoid fever have almost entirely ceased. The months of May and June are usually the healthiest of the year, and will probably be no exception this year."

BALTIMORE, MD.—During the week ending April 28 there occurred 172 deaths in Baltimore. Males 90, females 82; under five years, 68; over 60 years, 35. The annual rate, as stated by the local health board, was for the whole population, 21.86; for the white, 20.41; for the colored, 30.33. Small-pox caused four deaths, measles one, scarlet fever ten, whooping cough one, typhoid fever four, malarial fevers four, croup one, diphtheria 11, diarrhœal diseases three, puerperal diseases four, consumption 25, bronchitis four, pleurisy one, pneumonia 16, congestion of lungs two, and violence two.

MICHIGAN.—During the week ending April 21, the diseases which caused most sickness in the State were, rheumatism, intermittent fever, neuralgia, bronchitis, consumption, tonsilitis, influenza and pneumonia. Diphtheria was reported as prevailing at 13 places, scarlet fever at 18 places and measles at 22 places. Four cases of measles came with emigrants arriving at Port Huron April 20.

HUDSON CO., N. J.—C. J. Rooney's report for the week ending April 24 was received too late to be inserted in our table for that date. Total mortality 128; under five years, 35. Accidents caused five deaths, consumption 18, croup three, diarrhœal diseases three, diphtheria four, typhoid fever two, scarlet fever nine, pneumonia 21, congestion of lungs one, acute bronchitis four, and puerperal diseases three.

ATLANTA, GA.—Dr. Jas. B. Baird's report for the week ending April 21 also came to late to be tabulated. There were two deaths among the whites, one being under five years; and nine among the colored people, five of whom were under five years of age. Diarrhœa and consumption were the causes to which the deaths among the whites were assigned. Among the colored people two deaths were caused by consumption, two by pneumonia, one by diarrhœa and one by typhoid fever.

DISTRICT OF COLUMBIA.—During the quarter ending March 31 there were 1,200 deaths from all causes, which is 112 more than were recorded during the first quarter of 1882. Small-pox caused two deaths, or 11 less than during the corresponding quarter of the preceding year; scarlet fever 44, an increase of 33; diphtheria 20, a decrease of 16; croup seven, a decrease of 14; whooping cough three, a decrease of three; typhoid fever 19, a decrease of two; malarial fevers 14, an increase of two; diarrhœal diseases seven, a decrease of 12; consumption 227, an increase of ten; pneumonia 140, a decrease of four; bronchitis 32, an increase of five; congestion of lungs 22, a decrease of nine.

WILMINGTON, DEL.—The annual report of the Board of Health for the year ending Dec. 31, 1882, gives a statement of the mortality, from which we abstract as follows: population, 46,500; white 40,000; colored, 6,500. Total mortality, 1,143; white 912, colored 231. Rate per 1,000, white 18.64, colored 35.54, as compared with the rates of 27.4 and 59.7 in 1881, but these high rates brought forward for comparison were due to a small-pox epidemic which prevailed during that year. Consumption caused 162 deaths, or one in 6.8 of the total mortality. Cholera infantum caused 64 deaths; this is by far the most fatal disease which visited the city if the short period of its prevalence is taken into consideration. Diphtheria caused 13 deaths, typhoid fever 51, scarlet fever 22, malarial fevers 13, pneumonia 68, and small-pox 13. The deaths of small-pox patients occurred among 45 cases of the disease.

Of the decedents 506 were under five years of age, and 197 were over 60 years.

ONTARIO, CANADA.—The *Bulletin* for the week ending April 21 attributes the continued prevalence of bronchitis to the variable weather and to the prevalence of measles, to which disease it is often a sequel. Scarlet fever is increasing; in one of the districts its presence in a virulent form has necessitated the temporary closing of the public schools. Diarrhœa is steadily advancing, and municipal authorities are again urged to take measures for the removal of filth, which in its many forms plays the principal part in the causation of this so frequent and fatal malady.

VERA CRUZ.—During the month of March, 102 deaths occurred in the municipality. Seven of the deaths were due to yellow fever.

KINGSTON, JAMAICA.—Of 169 deaths registered during the month of March, seven were caused by fevers, malarial, remittent and typhoid, three by measles, nine by diarrhœa, five by dysentery, 15 by consumption, two by bronchitis, 57 by infantile diseases, and four by violence.

RIO DE JANEIRO, BRAZIL.—Consul General C. C Andrews transmits reports for the weeks ending March 17 and 24. During the first named period there were 303 deaths in the population, which numbers 330,000. Of these yellow fever caused 41 deaths, small-pox eight, typhoid fever one, pernicious fever nine, and consumption 50. If the deaths from yellow fever at the S. Isabel Hospital, the total number from that disease for the week would be about 62.

During the week ending March 24, there were 314 deaths, 52 of which were occasioned by yellow fever. This number does not include those which occured at the hospital. Small-pox caused eight deaths, typhoid fever four, pernicious fever 11, and consumption 37. An English seamen died of yellow fever on March 24. This is the first death from that disease which has occurred among the shipping during the present season.

HONOLULU, HAWAIIAN ISLANDS.—Consul D. A. McKinley reports 50 deaths as having oocurred in March; males 27, females 23; under five years seven, over 60 years 11; consumption caused five deaths, dysentery three, fever one, and leprosy one.

ENGLAND.—Vice-Consul Gen. L. H. Mitchell transmits the return of the Registrar-General for the week ending April 14. The annual rate of mortality in the 28 great towns averaged 24.7 per 1,000, Bristol giving the lowest rate, 16.9, and Hull the highest, 34.0. The mortality from whooping cough was heaviest in Hull and Plymouth; from scarlet fever, in Sheffield and Leeds; and from measles, in Liverpool and Sheffield. The 27 deaths from diphtheria included 20 in London, three in Liverpool and two in Birmingham. Small-pox caused two deaths in London, one in Leeds, and one in Sunderland, but not one in any of the 25 other towns.

LONDON.—Births 2,598; deaths 1,803. The births were 92 below, whereas the deaths exceeded by 42 the average numbers in the corresponding weeks of the past ten years. The annual rate, which had been 28.3 and 25.6 in the two preceding weeks declined to 23.8. Small-pox caused two deaths, measles 57, scarlet fever 14, diphtheria 20, whooping-cough 36, fever 20, diarrhœa eight, and violence 68.

SCOTLAND.—Consul Leonard sends a copy of the return of the Registrar-General for the week ending April 14. The average mortality rate in the eight principal towns was 27.9 per 1,000, or 3.1 above that of the corresponding week of last year. Aberdeen recorded the lowest mortality, 17.1 per 1,000; and Glasgow the highest, 33.6. Whooping cough continues to be the most fatal miasmatic disease; Glasgow recorded 20 deaths from this cause. One death from small-pox was noted in Glasgow, but none in any of the other towns.

Edinburgh—Total deaths 96, equal to an annual rate of 21.2. Measles, scarlet fever, typhoid fever and diarrhœa, each caused one death, diphtheria two, whooping-cough 10, acute lung diseases 26, and violence three.

BUILDING INTELLIGENCE.

[CONTINUED FROM PAGE 539.]

CHICAGO, ILL.—Cor Rhodes av and College st, br dwel, cost $75,000; o, F. Crumbaugh; a, Wheelock & Clay; b, Wm. Zelsdorf....292 Hermitage av, br dwel, cost $9,000; o, Mary E. Sands; a, Furst & Radolph; b, owner....437 N. Clark, br store and flats, cost $12,000; o, Ernst Schlick; a, Gudell & Blumenthal; b, Stuber & Kinker... 973 and 975 Adams, br dwel, cost $5,000; o, Mrs. M. Griffith; a, Wm. Thomas; b, Jos. McNeil....Cor North av and Dayton, br store and flat, cost $10,000; o, Chas. Cehagen; a, H. Turbor; b, W. Householder....3,448 Wabash av, br dwel, cost $8,000; o, B. Wolf; a, Jos. Schwitzer; b, Joe Cendy....1,737 Michigan av, br addition to dwell, cost $15,000; o, General Anson Stager; a, S. S. Beman; b, Porter....N. Water, nr Pine, br factory; cost $25,000; o, J. S. Kirk; a, Edbrooke & Burnbam; c, Alex. White; masonry by the day. ..858 and 859 Adams, br dwel, cost $5,600; o, Wm. Scott; a, Wm. Longhurst; b, C. Coghan ....513 Sedgwick, br dwell and barn, cost $5,000; o, Clement Busom; a, Heintz; b, Wolf & Walton....254 Ogden av, br store and flats, cost $12,000; o, R. Hitt; a, Wm. Strippleman; b, R. E. McKay....456-462 Hurlbert, four br flats, cost $30,000; o, Blomgren Bros. & Holmberg; a, Jas. Otter; b, A. Fagerlund & Co ...Weston av & Amlage, br dwels, cost $5,000; o, S. Prybye; a and b, John Schnor....648 and 650 Monroe, br dwel, $15,000; o. Matthews & Cornwall; a, Burnham & Root; b, Fox & Hinds.... 286 Hastings, br dwel, cost $5,200; o, John Rode; a, Cudell & Blumenthal; b, J. Stoom....514 Jackson, br flats, cost $7,000; o, E. B. Wheelock; a, W. H. Drake; b, Price & Son....Warren av nr Leavitt, br dwel, cost $7,600; o, John A. Sweet; a, Edbrooke & Burnbam; b, contract not let....Adams, nr Hayne av. br dwell, cost $6,000; o, J. Guy Owsley; a, Edbrooke & Burnbam; b, contract not let .. Warren, cor Leavitt, br dwell, cost $10,000; Geo. W. Tilton; o, same as last; b, contract not let....Astor st, br dwel, cost $26,600; o, J. Kimball; a, C. P. Thomas: b, W. A. Barton.. State, cor 33d, three stone stores and flats, cost $75,000; o, Herbert Cassard; a, same as last; b, not let .. N. Clark, nr Division, br apartment house, cost $50,000; o, H. Tift; a, same at last; b, Moss & Chambers....N. Clark, adjoining above, br apartment house, cost $25,000; o, F. F. Spencer; a and b, same as last....N. Clark nr Madison, s and br flats "The Albany," cost $75,000; o, J. and M. Gamble; a, same as last....N. Clark and Chestnut, br and st apartment house, cost $60,000; o, Hugh T. Frisch, b, Moss & Chambers.

CINCINNATI, OHIO.—Central av, nr 4th, alter br, cost $12,000; o, J. C. Thoms; b, Hy. Biers....Cor Harriet & Gesh, br, cost $7,000; o, J. J. Pfeffer; b, Fred Schlieper....5th, nr Wood, br, cost $7,000; o, D. H. Baldwin & Co.; b, Wm. H. Stewart & Sons.... 512 Race, br, cost $7,000; o, Wm. Ourtges; b, Aufdenbrinke & Co....Cor. Liberty & Central av, br, cost $10,000; o and b, Peter Scherer.

PHILADELPHIA, PA.—N 16th st, No. 1,525, 3 story dwel house; b, H. M. Martin ...19th S of Warton, 16, dwel house; o, Patrick Fleming ....Ripha av, N. of Washington st, 3 story dwel house; b, W. R. Davis....Hope N of Huntington st, 3 dwel house; Danl. Branagan....34th N. of Towelton av, 3 story dwel house; W.H. Kimball . 6th S of Moyamensing av, 6 2 story dwel house; b, Smith....Federal st, No. 217, 219, 3 story dwel house; o, W. D. Petland....Virginia st, No. 23, 36-38, two 2 story dwel house; b, F. Black ...Master E of Nasher st, 2, 3 story dwel house; E. Schmidt .. Cumberland E. of 8th st, 9, 3 dwel with stores; o, C. H. Misler....Center E. of 37th 4, 2 dwel house; b, L. W. Goodman....Alleghany E. Whitter st, dwel house; b, S. R. Stewart. .. Bower No. 554 dwel house b, Shegog & Quigly. ....S E cor 27th and Oxford st, 3 dwel; b Cotterill & Johnson.... Wheat Sheaf Lane e of Memphis st; o, W. K. Eltonhead...Spring Garden bet 38th and 39th st, 3 dwel; o, John Kelly [illegible] 52d st, 2 dwel; b, Chas. Christine [illegible] 5th st, bet Master [illegible] b, George Snyder....3038 N 6th st, 6 dwel; b, W. Schoch[illegible] 66 E and W side of Buchnell bet Montgomery av and [illegible] dwel, and 4 dwel; o, H. R. Shock... Barry, cor [illegible] Nice, 6 dwel; b, McLaughlin and McNamara; [illegible] 54th st, 2 dwel; o, Dan'l Deal....Robbins, 20th [illegible] o, E. L. Miller....Vine e of 56th st, chapel building; [illegible] Deal....Martell and Senace, 5 dwel; o, Thos. Cavanaugh; [illegible] n of Diamond, 17 dwel; o, E. H. Flood. ..Uber, cor [illegible] st, 17 dwel; o, E. H. Flood....Susquehanna av, bet [illegible] st, 8 dwel; o, E. H. Flood....Diamond bet Uber and [illegible] dwel; o, E. H. Flood....1738-40 n 19th st, 2 stores and [illegible] C. A. Snyder....434 e Dauphin, dwel; b, George K[illegible] Church st; dwel; b, George Kessler....846 n 4th st; [illegible] E. Schmidt....S W cor 21st and Samson; dwel; b, Stan[illegible] & Son....32d st n of Warton, 4 dwel; o, A. Wilson. [illegible] of 19th st, 5 dwel; o, M. B. Stackhouse....823-25 Bro[illegible] dwel; b, S. Wilson....Preston n of Oregon st; 2 dwel; b, [illegible] son ....258-60 Branner av, two dwel; builder, George K[illegible] 2008-2010, Vanpelt st, 2 dwel; o, J. Ruhl....Queen [illegible] R. R. & Ridge av, 3 dwel; b, C. Bartel....S w cor of Germ[illegible] av, and Oxford st, dwel; o, J. Kramer....324 Wildey st; [illegible] L, Schwab ...1416-1418 Mascher st, 2 dwel; b, J. Eichel[illegible] N. 5th st dwel; b, A. Heberlager.

PHILADELPHIA, PA.—Chelton and Magnolia av, pickerhous[illegible] Wright....Wynkrop, w of 13th st, two dwel h; b, Robe[illegible] Bryan....2d and Huntington st, factory; b, Robertson [illegible] S w cor 27th and Cambridge st, 12 dwel h; o, R. McClem[illegible] 2706 Germantown road, dwel h; o, Oliver Ottinger... [illegible] st, dwel h; b, J. B. Elliott.. Locust e of Juniper st, dwel[illegible] Robt. Trout....Hancock, bet Mill and Coulton st, six dwel[illegible] James Kramer & Son....Scott's lane and Crawford st, four dwel[illegible] h; b, Benj. Walker....Memphis ab York, four dwel h; [illegible] Brossert....Gray's Ferry road, w of 48th st, dwel h; [illegible] Murry....Chestnut w of 52d st, dwel h; b, Reuben Yarnall [illegible] Cornavon, bet Dickerson and Sasher st. 14 dwel h; b, John [illegible] ....1331 Palethrop st, dwel h; b, D. C. Schuler....505 North [illegible] st, dwel h; b, W. M. Schenhle....Vine, e of 55th st, stor[illegible] dwel; b, Henry Pettit....3rd, s of Dauphin st, dwel h; b, [illegible] Brossert....29th, s of Dauphin st, dwel h; o, Lewis Paul[illegible] Silverton av, w of 38th st, 13 dwel h; o, F. L. Michelson. [illegible] lantic ave, w of 38th, 15 dwel h; o, F. L. Michelson.

WASHINGTON, D. C.—Fifteenth st, bet O and P, br build; cost $6,000; o, W. S. Hays; a, Cluss & Schultz....21st st, bet O and R, br build; cost $5,700; o, C. J. Hyelin; a, Gray & Page; b, Langley & Co. .C st, bet 5th and 6th, br build; cost $6,300; o, W. G. Copeland; a, C. Schnieder.

WASHINGTON, D. C.—5th and E st, s e, brick church, cost $9,000; o, Trustees; a, C. Brent; b, C. Gessfor....M bet 17th and 18th, br build, cost $7,000; o, W. T. Okie; a, R. Stead ...K, bet 16th and 17th, br build, cost $14,000; o, M. Edes; a, Wm. Poinderter; b, John Henderson. ..15th, bet I and K, br build, cost $5,000; o, B. McCarthy; b, Cluss & Shultz....Virginia av, and 5th, br build; cost $5,400; o, W. Barrington; b, W. S. Price. ..O st, 12th and 13th st, two br build, cost $7,000; o, Theo. Sheckels; b, Down Bros.. .13th, bet S and T, four br build, cost $12,000; o, Duvall & Marr....Dumbarton av, two br build, $5,000; J. R. Monly; b, G. Friebus....Fayette, bet 2d and 3d, br build, cost $9,500 o, A. M. Bell; b, A. M. Bell....19th st, bet 2d and R, four br build, cost $30,000; o, D. A. Windsar; b, Chas. Cole.

WORCESTER, MASS.—Hanover, fr dwell, cost $6,000; o, W. F. Collier, b, J. A. Prince....Agricultural, fr dwell, cost $4,200; o and b, J. P. Faber....Coral, six tons, cost $9,000, o. E. E. Brown, b, J. Gillon....Mechanic, br block; cost $8,000; o. J. E. Day; a, Fuller & Delano....Cedar, fr dwell, cost $7,000; o, J. D. Washburn; a, Arthur Little; b, H. W. Eddy....N. Merrick, two fr dwel, cost $5,000 each; b, Chas. Hubbard....Pleasant, alteration of Baptist Church, cost $5,000; o, Baptist Society; a, S. C. Earle.... Summer, br ten, cost $7,000; o, L. N. Smith; a, Barker & Nourse.

NEW HAVEN, CT.—Howe st, nr Whalley av, br block; cost $8,600; o, L. H. Perkins and J. W. Downes; a, R. G. Russell; b, Bates & Townsend....Wall st, br dwel; $6,000; o, Dexter Alden; b, E. Treat.. Wall st, br block; cost $12,000; o, Dexter Alden; b, E. Sperry....Meadow st, br block; cost $8,000; o, M. Curran.... Orange. st, bet Avon and Cottage, two fr h; $8,000; o, A. L. & H. C. Matthews; a, Palliser & Co.; b, Clark & Thompson.

PROVIDENCE, R. I.—Barnes and Brown, fr dwel, cost $12,000, o, Edward S. Aldrich; b, Robson Pierce....Pine and Claverick, fr dwell, cost $7,500; o, George and Elizabeth Humphreys; b. Dexter Gorton.

ROCHESTER, N. Y.—Center cor of Jones st, br bldg; cost $25,000; o, M. H. Fitzsimmons....Exchange st, br bldg; cost $30,000; o, Alling & Cory; a, Warner & Brocket; b, H. H. Edgerton....Cataract st, br dwel; cost $10,000; o, Elizabeth Rau; a. Oscar Knebel.

ST. LOUIS, MO.—Franklin bet Cardinal & Compton ave's, 2 adjacent br dwel; cost $7,500; o, J. and P. Sheehan; a, J. H. McNamara; b, sub-let....Dillon st bet Hickory & Park av, br dwel; cost $5,000; o, Mrs. Douglas; a, Beinke, b, Remmers & Thomsen....Locust bet 5th & 6th st, br st $12,000; o, Mrs. Eliza Hager; b, sub-let.... Washington av bet Vandeventer & Sarah st, br dwel; cost $6,000; o, Clara R. Saunders; a, J. Stewart; b, Jas Stewart & Co..... Olive bet 19th and 20th st, br marble and granite factory cost $8,000; o, R. L. Rosebrough & Sons; a, Jas. Stewart; b, sub-let.. Washington av bet 20th & 21st st, addition to br range factory; c, $6,000; o, Culver Bros. b, sub-let... Lucas av, bet Garrison & Compton ave's; 2 br dwel; cost $5,000 each; o, G. Conzelman; a, J. B. Legg, b, F. C. Bonsack. ..Lasalle st, bet and Carondelet av & Mississippi ave br dwel; cost $8,000 o, Geo. Peich; b, J. A. Conlon.... Franklin bet Elliot & Leffingwell ave's br st and dwel; cost $8,000; o, J. O'Brien; a, Piepers; b, N. L. Wickwire.... Olive st bet Grand & Cabamre ave's br dwel; cost $5,000; o. J. B. Legg; b, sub-let....Allen av bet First and Kosciusko st, br round house; cost $16,000; o, St. L. J. M. & So. R. R. Co. b, Herin Bros.....Olive st bet Vandeventer & Taylor av, br dwel; cost $6,000; o, H. Langenberg; b, Chas. Aufderheide....Pine bet 2d and 3rd sts. br st; cost $14,000; o, R. Lackland; a, Lee; b, B. Weber & Co... 2d bet Webster & Chambers sts, br chair factory; cost $25,000; o, S. H. Comrades; a, A. Beinke; b, A. Beinke...6th bet Biddle & Carr st livery stable; cost $15,000; o, J. C. Bensieck; a, Beinke; b, B. Weber & Co.... Morgan st bet Garrison and Ewing ave's, br dwel; $15,000; o, Mrs. E. T. Lewis; a, Grable; b, Sam Ross ...Ferry st bet Hall and the river; br pot works; cost $20,000; o, Young & Dixon; b, Sam Marsden.

BUFFALO, N. Y.—Broadway cor Oak st, store; cost $6,000; o, R. Oehmig; a, J. C. O'Sullivan. ..Main nr N Division st, store; cost $10,000; o, M. Mesmer; a, Geo. J. Metzger; b, Schmidt Bros.... Main nr N Division st, store; cost $12,000; o, Mrs. S. J. Birdsall; a, Geo. J. Metzger; b, Schmidt Bros.. Pearl cor Erie sts, carriage repository; cost $15,000; o, M. R. Eames; a, Geo. J. Metzger; b, Runville & Rupp ...Oak cor Virginia sts; stores and apartments; cost $15,000; o, W. J. Williams; b, L. Leinert & Son....Main cor Exchange sts, additions and alter in mansion house, cost $20,000; a, Geo. J. Metzger; b, Runville & Rupp.

MILWAUKEE, WIS.—St and pressed br dwel; $25,000; o, Samuel Chandler; a, Treat & Foltz; b, not let....Jackson st and Wisconsin av, red br club house; cost $50,000; o, Milwaukee Club; a, Burnham & Root; b, not let.

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Proposals for building part of Lock No. 2, of the Great Kanawha River Improvement, *West Virginia*, will be received until noon of May 15, 1883, and opened immediately thereafter.
Blank forms and specifications can be had on application to this office. WM. P. CRAIGHILL,
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OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., *April* 25, 1883.

Sealed proposals will be received at this office until 12 m., on the 16th day of May, 1883, for all the labor and materials, bricks and mortar and setting stone required to complete the Custom House, etc., at *Toledo, Ohio*, in accordance with drawings and specifications, copies of which, and any additional information, may be had on application at this office or the office of the Superintendent.
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PROPOSALS FOR FUEL, FORAGE AND STRAW.

DEPOT QUARTERMASTER'S OFFICE, HOUSTON ST., COR. GREENE, NEW YORK CITY, *May* 1, 1883.

Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, until 12 o'clock, noon, on the 31st day of May, 1883, at which time and place they will be opened in presence of bidders, for furnishing and delivering Fuel, Forage and Straw required at *New York City, Willet's Point, N. Y. H.*, and *David's Island, N. Y. H.*, during the fiscal year ending June 30, 1884.
The Government reserves the right to reject any or all proposals, or to accept as may be most advantageous to the Department.
A preference will be given to articles of domestic production, conditions of price and quality being equal, and such preference will be given to articles of American production produced on the Pacific coast to the extent of the consumption required by the public service there.
Blank proposals and printed circulars stating the kind and estimated quantities required at each post, and giving full information as to the manner of bidding, conditions to be observed by bidders, and terms of contract and payment will be furnished on application to this office.
Envelopes containing proposals should be marked:—"Proposals for Fuel, Forage and Straw," and be addressed to the undersigned.
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NOTICE TO CONTRACTORS.

The Board of Commissioners of Porter County, Indiana, will receive proposals until two P. M., May 24, 1883, for the erection of a Court House in the city of *Valparaiso*. The plans and specifications can be seen at the Auditor's office in Valparaiso, and at the office of J. C. Cochrane, architect, No. 78 Ashland Block, corner Clark and Randolph streets, Chicago. Contractors can obtain printed instructions as to requirements and form of proposals, upon application to the auditor or architect.

[Signed] L. P. SCOTT, N. PICKRELL, F. BURSTROM, } *Board of Commissioners.*
[Attest] W. E. BROWN, *Auditor Porter County.*

For information as to public work to be done in Kansas City, Mo., during the present season, address,
W. B. KNIGHT, *City Engineer.*

The Secretary of the Navy will receive sealed proposals until noon July 2, 1883, for the construction by contract of three steam crusiers and one dispatch boat.
Designs, specifications and full information may be had by addressing WM. E. CHANDLER,
Secy. of Navy, Washington, D. C.

Proposals for enlarging and increasing the water supply of *Quebec* will be received until May 15. For conditions, etc., address
C. BAILLAIRGE, C.E., Quebec.

The Fire Department of New York City will receive proposals until May 16, for a tubular boiler for fire engine No. 6.

For the erection of a court house for *Guadaloupe, Co., Texas.* Until May 16. Address, C. L. ARBUCKLE, *Clerk of County. San Antonio, Texas.*

Proposals will be received by the School Trustees, 19th Ward, New York City, for erection of a school house. Until May 14.

For furnishing 500,000 granite paving blocks, more or less, will be received until May 21, 1883. For information, address.
Maj. G. J. LYDECKER, *Washington, D.C.*

Proposals for building sewers, and for paving various streets, will be received by the Department of Public Works, New York City, until May 16, 1883.

Furnishing new boiler to steam fire engine, No. 6. Until May 16. Address board of commissioners, New York Fire Department.

Excavating and piling for foundations to hospital at the foot of East 16th street, until May 15. Address Board of Health, 301 Mott street, New York City.

Proposals will be received from iron manufacturers until May 19, 1883, for the furnishing all materials and labor for the completion of the iron caisson of Sandy Point Shoal Lighthouse, Chesapeake Bay, Maryland. Full information may be had of Major O. E. Babcock, Baltimore, Md.

For the erection of a soldiers' monument until August 1st. Address S. E. Merwin, New Haven, Conn.

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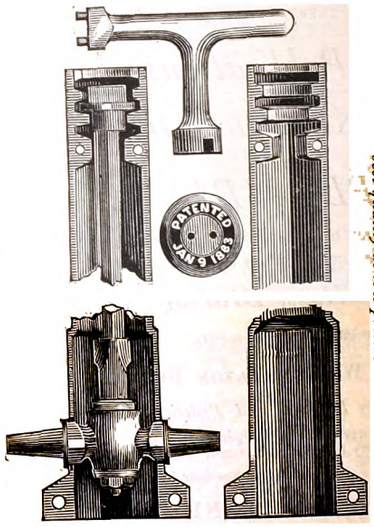

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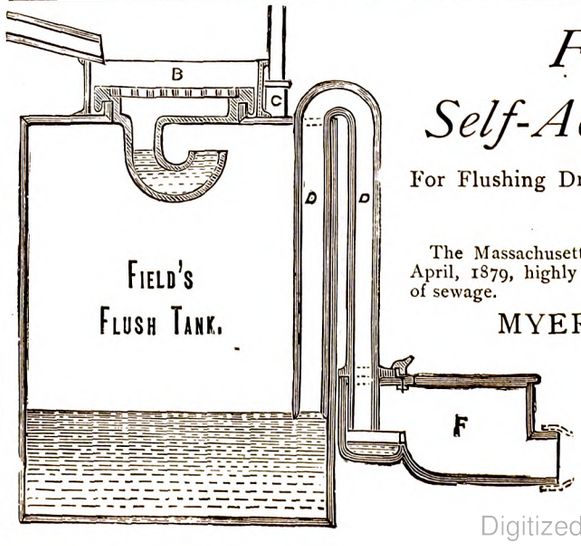

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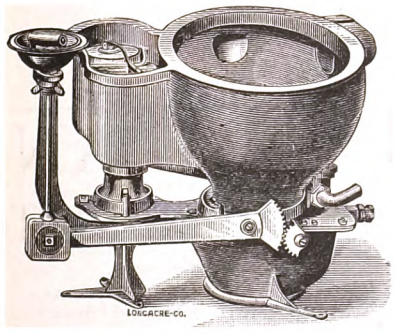

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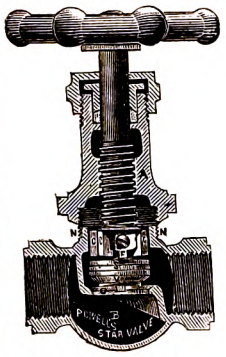

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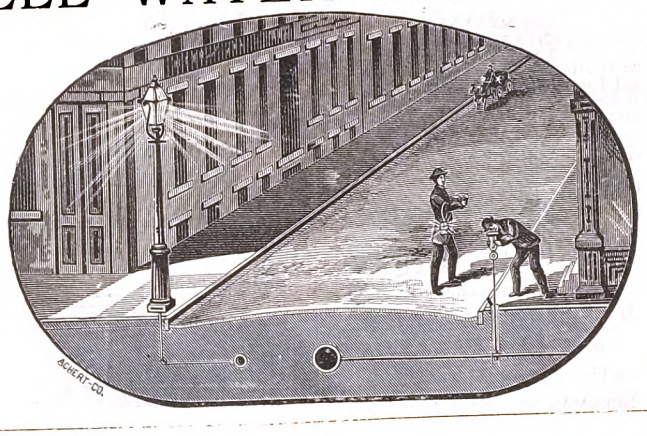

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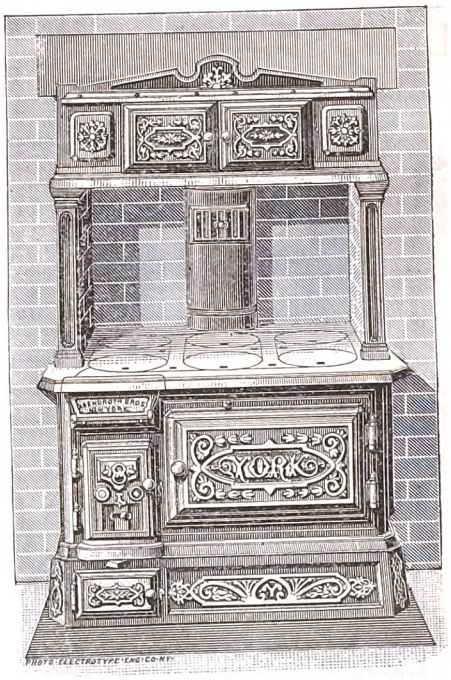

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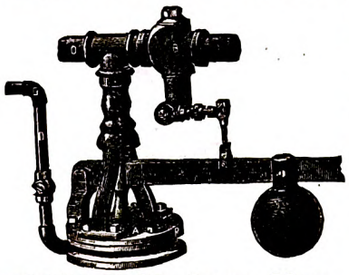

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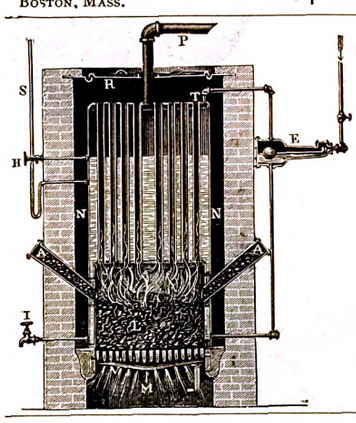

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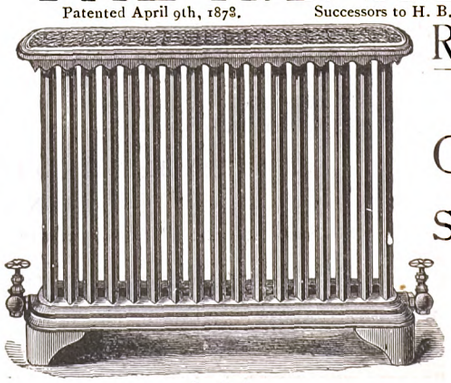

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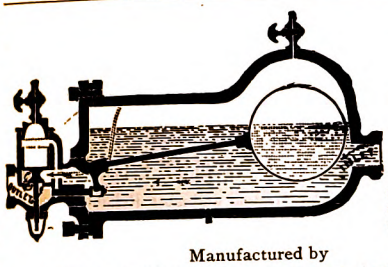

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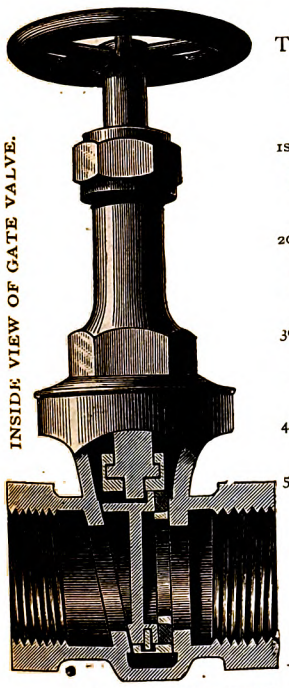

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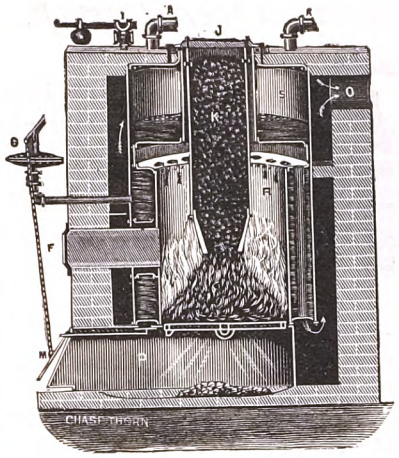

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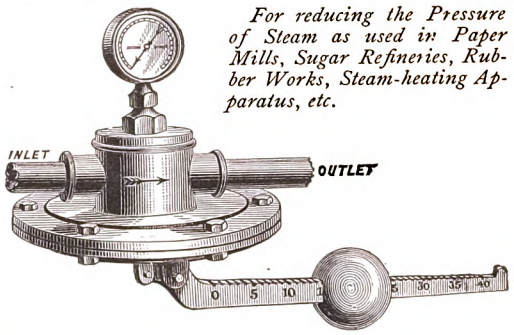

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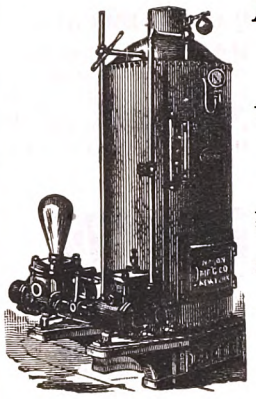

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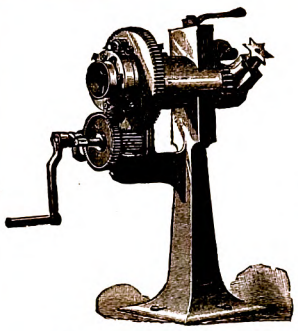

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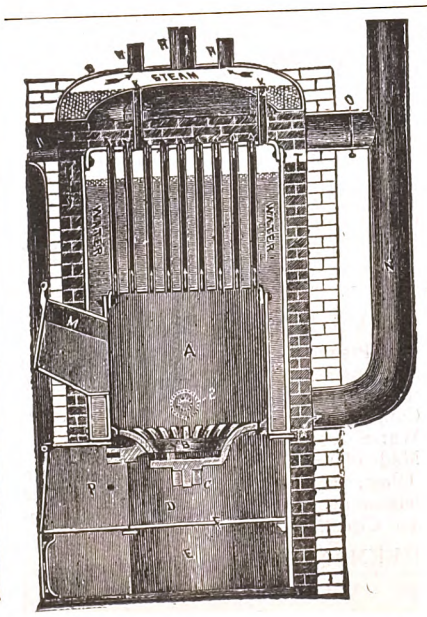

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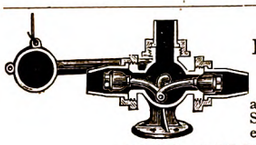

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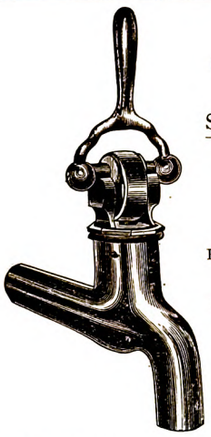

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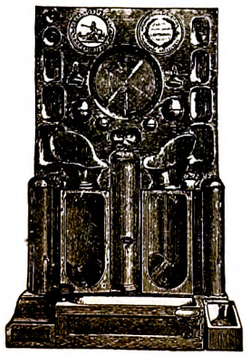

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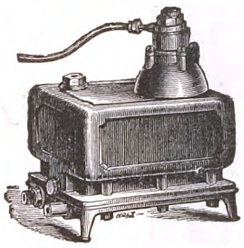

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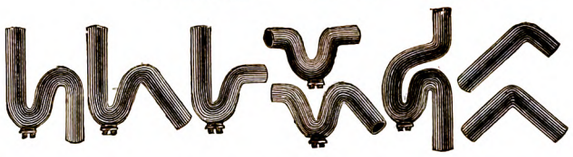

These Celebrated Traps are made in the same way as lead pipe—Sound and Smooth, Even Thickness, no Seam, can be Flanged and Plugged as easily as waste pipe. These Traps are acknowledged by the trade to be the best made.

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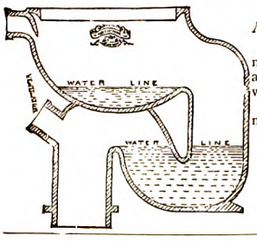
The "National" Patent Side Outlet Closet and Trap.

WITH IMPROVED FLUSH. (Registered).

Made either complete in one piece of Earthenware, or in two pieces with Basin and Trap separate.



An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin.

The Most Cleanly, Durable, Effective and Cheapest Closet and Trap ever used, requires no fittings nor Machinery of any kind, and cannot get out of order.

For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

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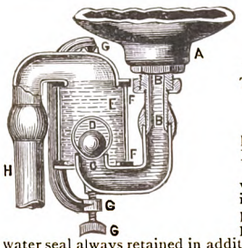

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It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted Glass or metal section furnished at same price. Send for circular and price list.

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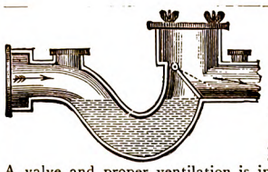

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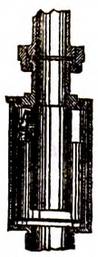
Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.



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Cannot siphon out.

Water seal always perfect.

Made of Brass, Porcelain or glass. When of Glass, the workings and benefits of the invention are plainly seen. Send for illustrated Circular. Address,

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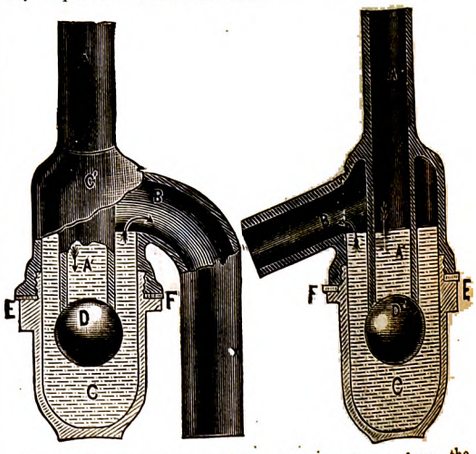
A Positive Valve Seal. A Sound Water Seal.

Simple, Cheap, Effective and Durable.

Under the severest tests to which a trap could be subjected by a commission appointed by the National Board of Health, and whose report was printed in full in THE SANITARY ENGINEER, it will be seen that the BOWER TRAP offered greater resistance to syphonage action than any trap manufactured for sale.



The Manufacturers solicit correspondence from the public, especially the Trade and Architects.

Will be pleased to answer any questions as to the application and effectiveness of this Trap. Send for circular.

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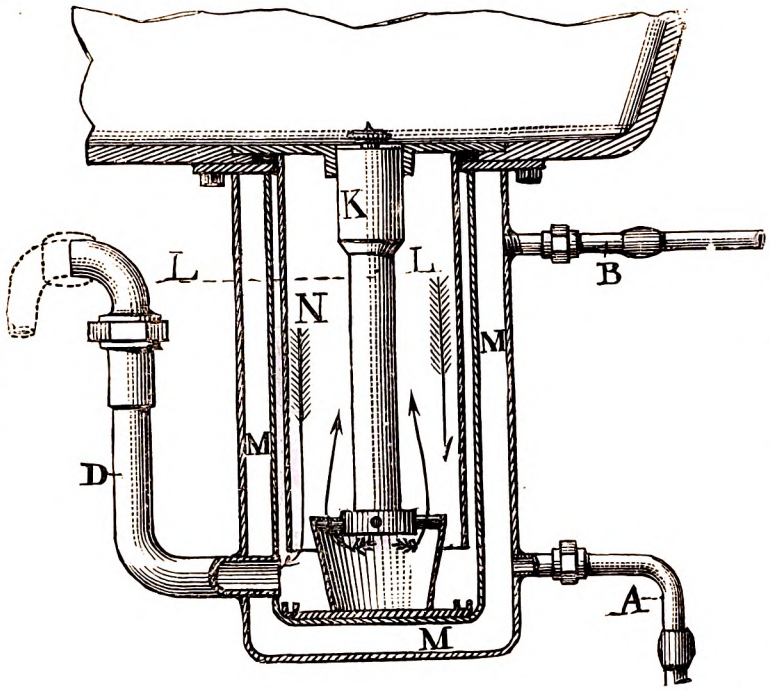
THE TUCKER GREASE TRAP.

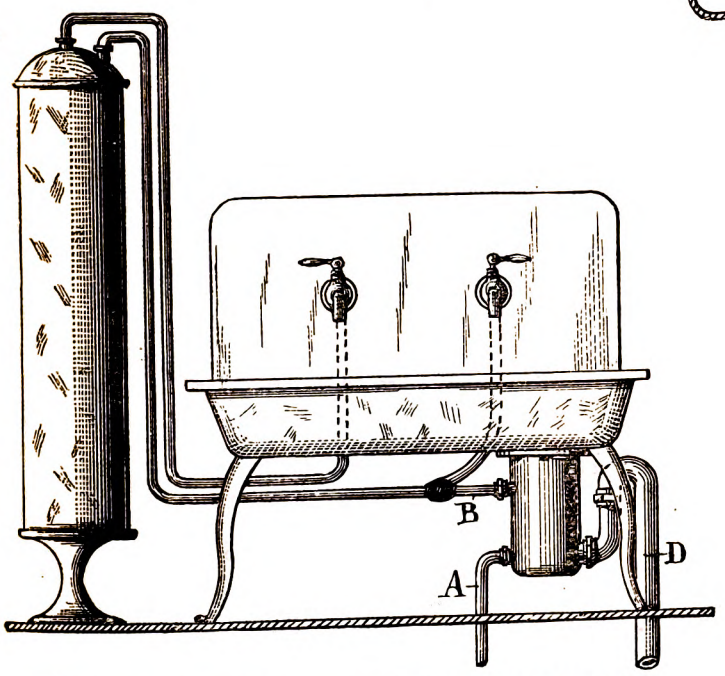
THE necessity for the use of a grease trap under kitchen and butler's pantry sinks, is too well recognized by sanitary engineers and plumbers to require any argument. The frequent stoppage of drain pipes which receive the waste water from kitchens of hotels, restaurants and private houses where much dish washing is done, is well known to those who have suffered the annoyance, and been obliged to pay for the frequent removal of the clogging grease. Believing that the *Tucker Grease Trap* is the best device yet designed for that purpose, we have arranged with its inventor to manufacture and supply the trade with this useful appliance.

Mr. Tucker informs us that he has, among others, thus far fitted them up in the following buildings: Residence of Cornelius Vanderbilt, Esq., Residence of the late Robt. L. Stuart, Esq., Residence of Theo. Havemeyer, Esq., and Restaurant in the Mills Building.

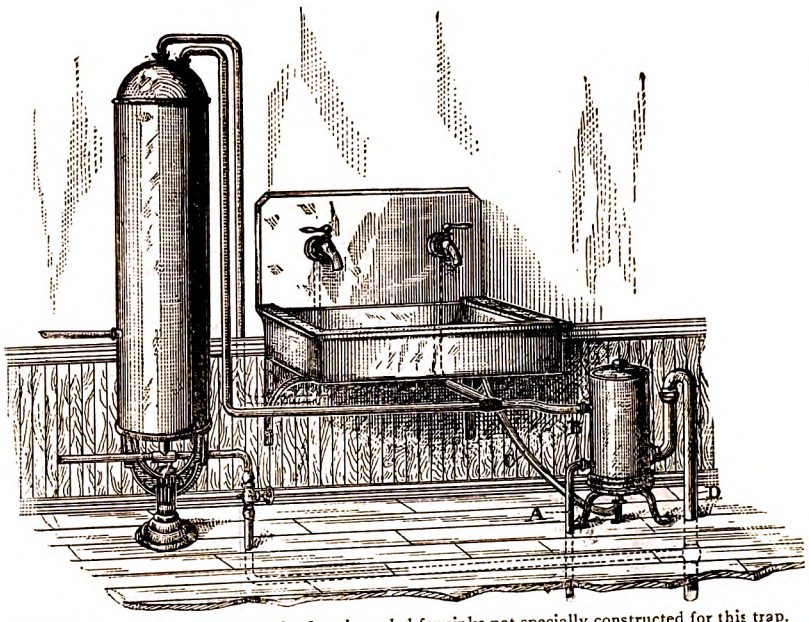
The grease is retained in this Grease Trap in the following manner:

The waste water passes down the tube *K*, following the course shown by the arrow into the waste pipe *D*. The depth of the standing water is indicated by the line *L*. Cold water circulates in the jacket *M*. It enters from the cold water pipe *A* and passes out at *B*; this has the effect of chilling the grease in the compartment *N*. The grease being on top, naturally increases in depth until it occupies this space, when it prevents the water passing into the pipe *D*. This will be indicated by its failure to run off. The chamber *N* with the tube *K* can then be lifted out, and the cake of grease removed. The parts may then be put back and again used until it is necessary to repeat the operation.





This represents the form used under and attached to a kitchen or pantry sink.



This represents a form to set on the floor intended for sinks not specially constructed for this trap.

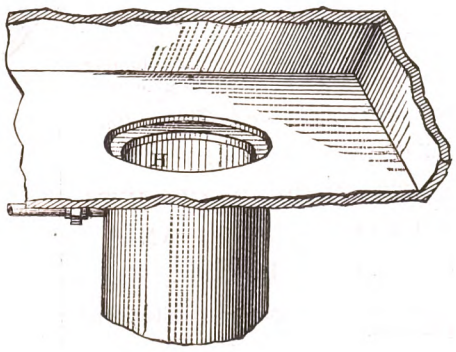


FIG. 4.

FIGURE 4. Shows the shell of the trap with the grease collector removed.

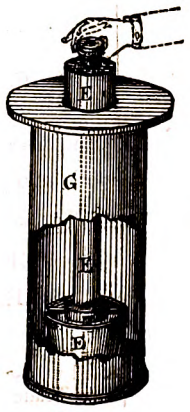


FIG. 5.

FIGURE 5. Shows the removable part of the grease collector.

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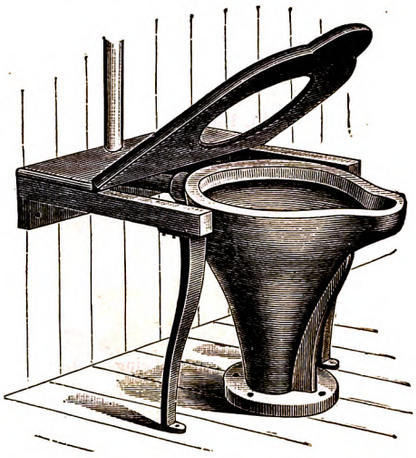
DELUGE HOPPER



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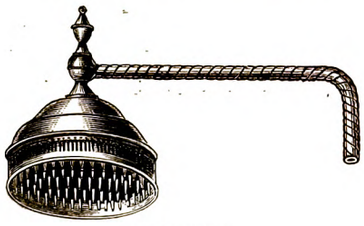
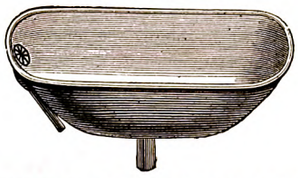


SHOWERS.



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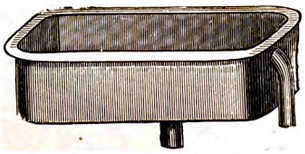

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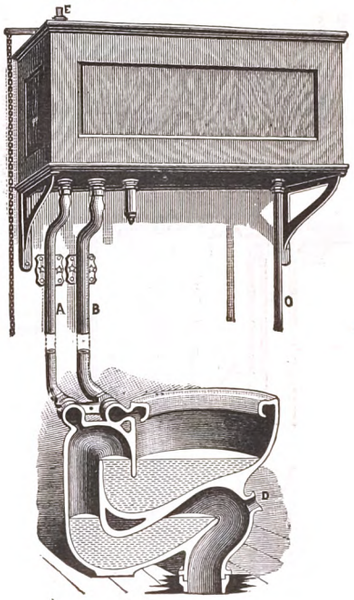

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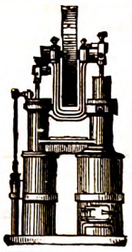

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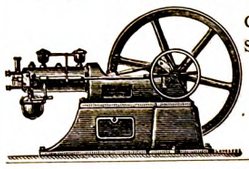

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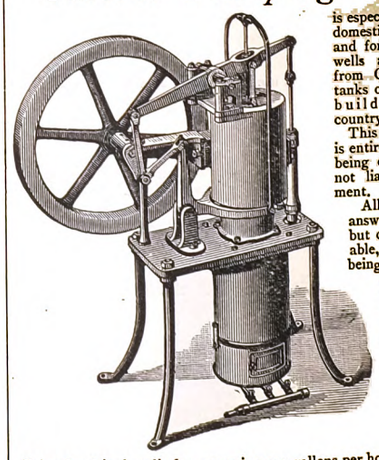

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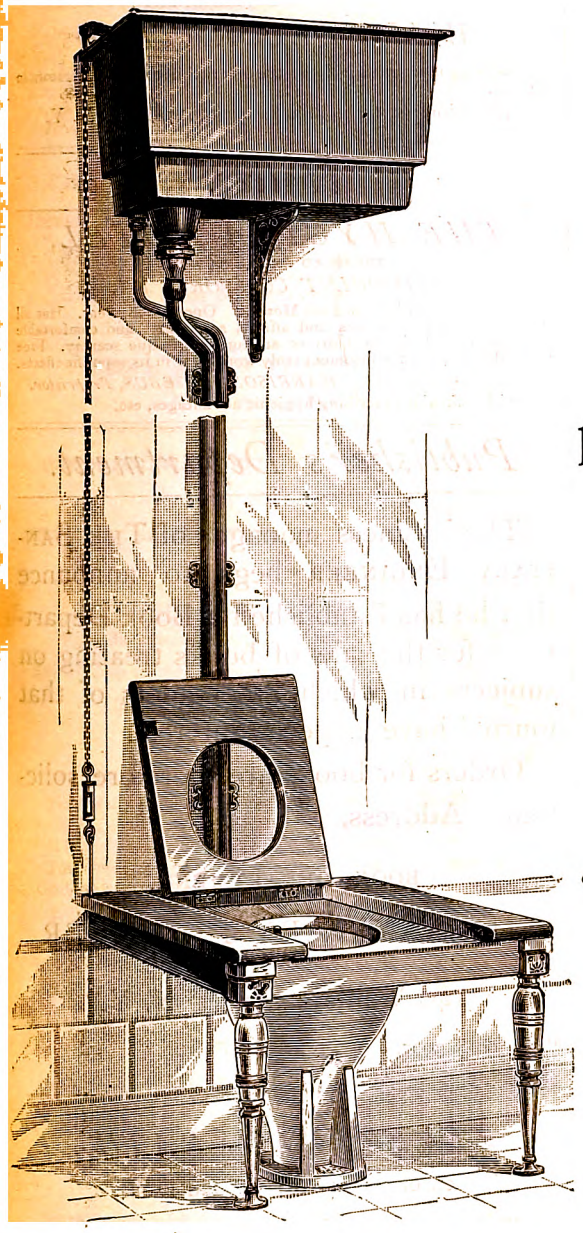

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Hoppers,

WITH

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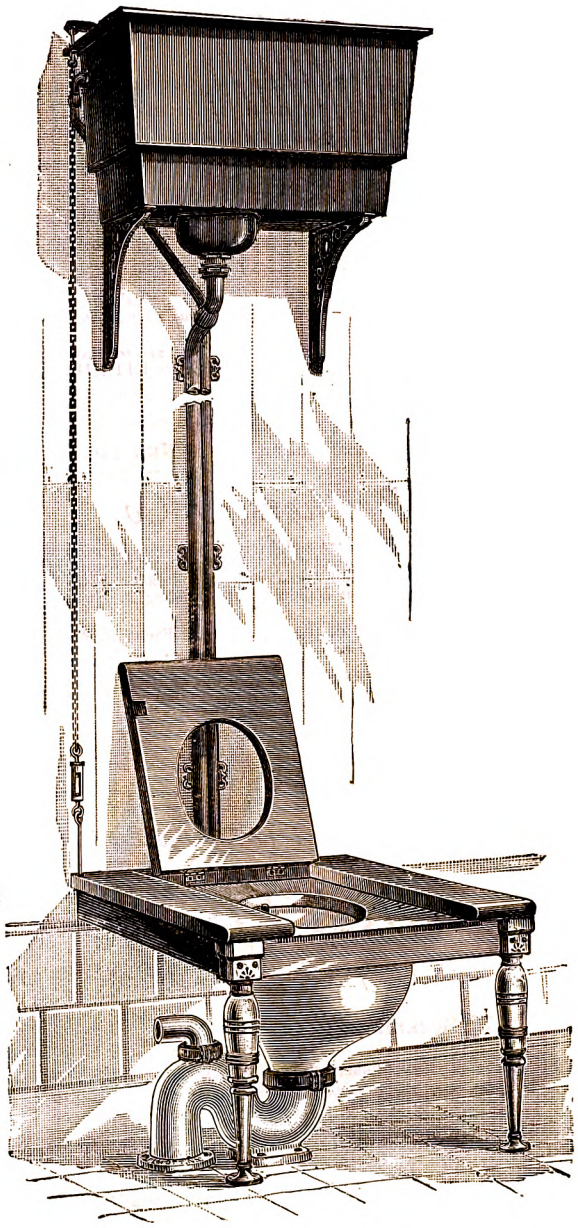

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THE PRESIDENCY OF THE NEW YORK HEALTH BOARD.

The Mayor of this city last week nominated Prof. Charles F. Chandler for the position of Health Commissioner and President of the Health Board, which office he has held for ten years. This admirable nomination was promptly rejected by the Board of Aldermen by a vote of thirteen to ten, eleven of the majority being members of Tammany Hall, and two were so-called Republicans. This nomination gave satisfaction and gratification to those of our citizens who are interested in the sanitary welfare of the city, and dread the introduction of partisan politics in a department that under the circumstances has hitherto been kept remarkably free from its demoralizing influences.

From this statement of fact our readers outside of this city may deem this rejection inexplicable. For their information, therefore, we shall briefly explain the situation and the various causes said to have produced the result. As might be expected, an efficient health officer makes enemies, and these enemies in this instance are claiming credit for Prof. Chandler's rejection.

Among others, there are the class who have sold and want to sell skimmed and adulterated milk; others want to pile up manure to rot until is suits their convenience to remove it; others want to be permitted to drive cattle through our streets; others want to build and maintain wretchedly bad tenement houses, and others who manufacture vitrified tile pipe are annoyed because the Health Board, under Dr. Chandler's leadership, have deemed it to be their duty to prohibit its use inside the houses to be built in this city, for the very good reason that it is impracticable to insure its being so laid in this city as to prevent leakage and consequent pollution of the soil and air within the building.

All of these classes have sought legislation in behalf of their special interests. The public welfare demanded that their efforts should be thwarted, and Prof. Chandler never hesitated to oppose such measures, and, up to this time, with conspicuous success, consequently we have for some time heard boasts from persons claiming to speak for these interests that he would not be permitted to serve again as Health Commissioner, and these people no doubt take considerable credit to themselves for his rejection. We, however, are not disposed to attribute the action of the Board of Aldermen to their influence, nor do we consider that his creditable record in this respect has cost him his place.

It is due to the desire of the local political leaders to have a man as president of the Health Board who would be of some use to some political organization; in other words, as a prominent member of Tammany Hall said: "as that is a sixty-five hundred dollar office for six years, I suppose our people think some of our own men should have it" (the salary, by the way, is now $5,000); consequently the eleven votes controlled by that organization, and two controlled by a man who uses them to make terms with those who need them on a close contest, decided the issue last Wednesday. As we write, many of our best citizens are working to induce the leaders we have referred to, to permit this office at least to go to a man who does not need it, but whose special training, long experience and executive ability, peculiarly fit him for the proper performance of the responsible duties it imposes, and there is a bare possibility that the vote of last week may be reconsidered, and Prof. Chandler yet be confirmed. When we consider the great discretionary power vested in our New York City Board of Health—powers placed there because of the confidence in the ability and integrity of its active members, we cannot but view with deep concern the possibilities involved in a change in its presidency.

THE RAMAPO SCHEME.

Some of the questions of hydraulic engineering involved in the project for bringing the Ramapo water to New York, are discussed by *Engineering News* in its last issue, at considerable length and in a manner displaying a thorough acquaintance with the principles at issue and the peculiarities of the scheme which has been advocated. The discussion is timely, and is of interest, as illustrating very forcibly the ground we have taken, that the Ramapo scheme was not sustained by impartial evidence, but was put forward on insufficient and one-sided arguments.

The point particularly dwelt upon by *Engineering News*, is the insufficiency of the proposed reservoirs to furnish permanently the quantity of water which the bill now in the Governor's hands requires to be guaranteed.

It is shown that the assumptions of the Ramapo engineers, regarding the probable rainfall, are not based on the observed facts, nor even on sound theory, and that even with the most liberal allowance, the storage capacity proposed to be furnished by the embryo company, while it may suffice for average years, will unquestionably fail in a year of minimum rainfall. To insure a daily supply of 50,000,000 gallons, from 85 square miles, will require very much greater storage capacity than can be furnished for the money proposed to be expended.

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Regarding a supply of water for fires, the writer makes a suggestion which strikes us as eminently practical. It is, that instead of gathering "the water from a score or more of reservoirs in Rockland County, with all their automatic contrivances under private management, and bringing it in four lines of pipes under the Hudson River and selling it to the city," a line of pipe be laid to the Boyd's Corners reservoir, in the Croton Valley, which is 41 miles from the city, and 600 feet above it. This is a simpler, cheaper and more effective method of getting a fire pressure than the complicated Ramapo scheme, with its contingencies of lawsuits and possible entire failure.

We are glad to see this subject, of so great importance to this city, treated on its merits as a scientific and practical problem by our contemporary, and we venture the opinion that if any money is ever furnished to carry out this Ramapo project, it will be because some speculators believe that they can construct their plant from plans of their own, without interference from outsiders, and just durable enough to hold water till they can sell it to the city. To our mind, few schemes within late years suggest greater possibilities for fraud and rascality.

The American Steam Heat and Power Company has, on the application of its bondholders, been placed in the hands of a receiver. It is stated that most, if not all, of the money thus far expended is from the sale of bonds, the stock being largely held by politicians and others who secured the franchise, and who have paid nothing for it. The bondholders, therefore, are unwilling to put up any more money to be spent as hitherto. We learn that if these stockholders can be got rid of, it is proposed to furnish more money and try it again, a prospect, in view of our past experience in this city, not pleasant to contemplate.

DIPHTHERIA AND MILK SUPPLY.

Under date of February 1, 1883, Dr. H. F. Parsons has presented to the Local Government Board of England a report on an outbreak of diphtheria at Devonport in November and December last. The outbreak was not an extensive one, 18 households having been affected, the number of cases being 31 and of deaths five. The families attacked were those of professional men and of officers of the army and navy. No case occurred among the large working-class population.

Dr. Parsons was unable to find anything peculiar in the sanitary condition of the houses to account for the occurrence of the disease, nor, except in a few instances, was there exposure to infection from a previous case.

It had been observed that the greater number of the persons affected had obtained their milk supply from a particular dairy, and special investigation was made on this point. Dr. Parsons' conclusions are as follows:

"1. Although it cannot be affirmed with any degree of certainty that there was any casual connection between the outbreak of diphtheria and the particular dairy, yet the limitation of the disease to the consumers of the milk indicates that this was probably the case.

"2. The small proportion of the customers attacked shows that any contamination of the milk by infective material could have been only partial and occasional in its occurrence.

"3. The cause of the diphtheria—if the infection were conveyed by milk—may have been some condition existing at the milk-shop premises or at the farm.

"4. On the milk hypothesis, the milk must have first received infection about the beginning of December. The child in the adjoining house may have received infection from the same source, or from the milk itself, which she was in the habit of drinking.

"5. The increased prevalence of the disease in the latter part of December—18 out of 32 cases having commenced between December 21 and 30 inclusive—may be due to infective matter reaching the milk in larger quantity from the case of diphtheria in the house adjoining the milk shop.

"6. It may be suggested whether the infective matter may have gained access to the milk by the wiping out of the cans with cloths which had been hung up in the narrow, close back-yard, and had contracted impurities from the atmosphere.

"No connection was apparent between the amount of milk consumed and the occurrence of diphtheria. Some, indeed, of the persons attacked were stated to be large milk drinkers, but others again took it only in small quantities in tea or coffee. The large proportion (20 out of 31) of cases among persons above the age of childhood is unusual, and its explanation on the milk hypothesis is difficult."

THE DISPOSAL OF SEWAGE BY SUB-SURFACE IRRIGATION IN SUB-URBAN RESIDENCES.

By Edward S. Philbrick, C. E.

(Continued from page 531.)

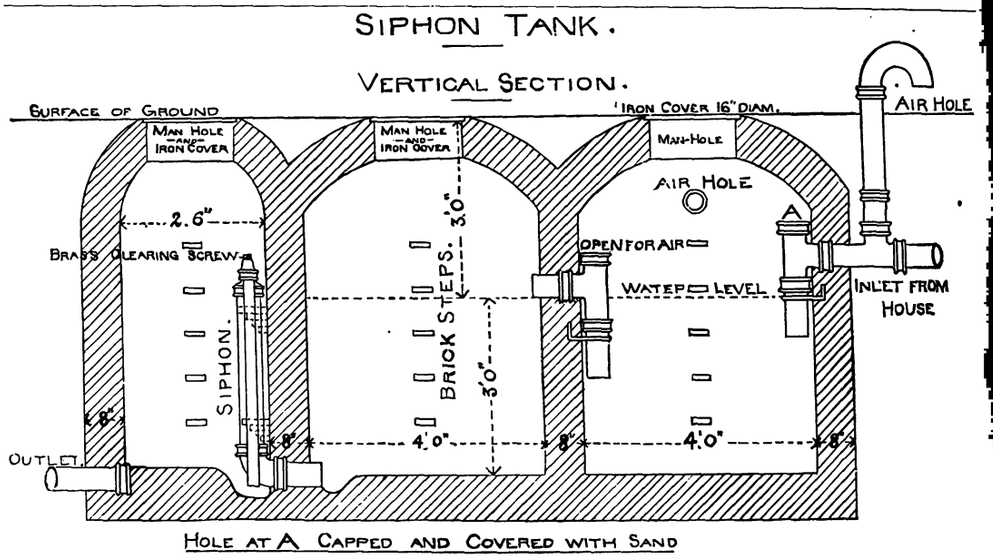
If an attendant looks at the lower end of the syphon every few days and cleans out the notch or small syphon as often as choked, it will resume operations; but such attention is annoying and is not expected to be supplied to an apparatus claimed to be "automatic."

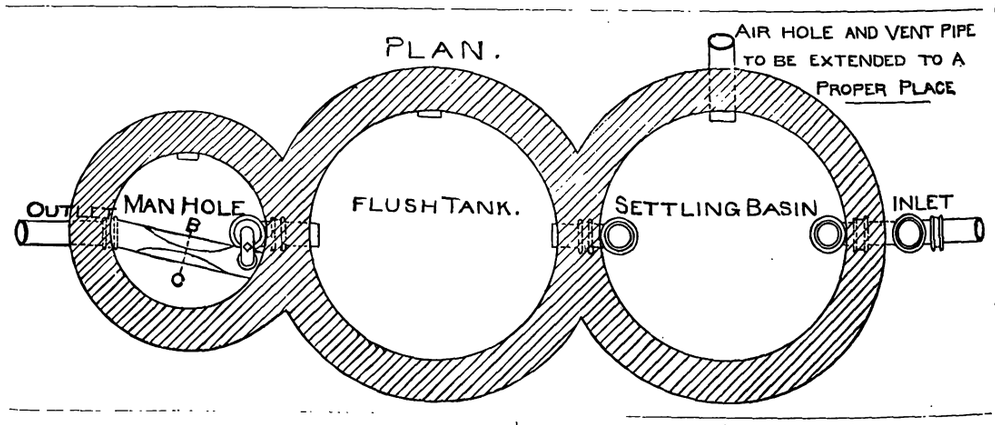
If the volume of sewage is large, such as would flow from a combination of several houses, the whole apparatus is on a large scale, and the small syphons or notches would be so forcibly flushed by the periodic flow, that they are not so likely to become choked as when small pipes are used for a smaller volume of sewage.

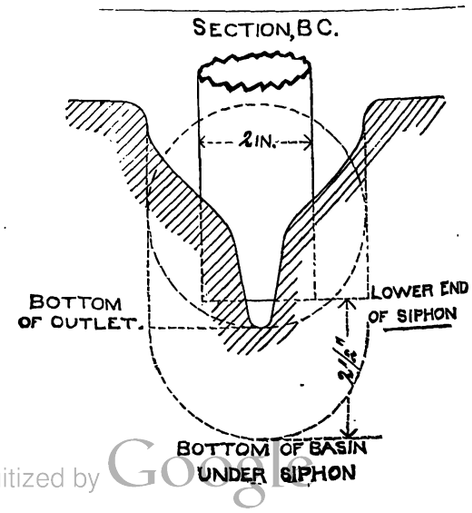
After trying experiments with results as above described for a year or more, the writer had recourse to a different form of the apparatus, and succeeded in overcoming the difficulties above described to a very large extent, if not entirely.

Whether or not this modification is subject to Mr. Field's patent is perhaps a question which it is left for others to determine. The apparatus as thus modified, has now been in public use so long that no one can procure a valid patent upon the improvement, and it is therefore presented to the public for what they think it worth, subject to Mr. Field's patent if found to be so. Instead of cutting a V-shaped notch in the edge of the cup at the lower end of the syphon, or using a small syphon to discharge the cup, it is proposed to abandon the cup, making instead a channel in the direction intended for the outlet, and contract the sides of this channel at a point about a foot from the end of the syphon, so that they shall obstruct the flow and raise the level of the water to such a height as to seal the end of the syphon whenever a slight flow begins. Since this narrowing of the sides is made very gradual by smooth flowing curved lines, and the sides are formed of cement, troweled smoothly and carefully, and expanding again below in the same manner, the channel is found to keep itself clear of rubbish, and needs no attention to keep it free. In the annexed diagrams sectional views are given of this channel, which will serve to explain this description.

If the syphon were to be applied directly as an outlet for the tank which receives the sewage from the house, it would soon get choked by the scum which collects on the surface, or by the sediment which collects on the bottom. It is, therefore, found best to construct a second tank between the first, which I call the "settling basin" on the plan, and the syphon itself. The second is called the "flush tank," for it is alternately filled and discharged, while the first one always remains full. The inlet drain should dip some eight inches below the water line, as shown, with a hand-hole at the top (at *A* on the section), covered with a cap, fitted into the hub, and some sand on it to prevent the foul air from following up the drain from the tank to the house. The vent hole outside for the inlet drain operates as a foot vent for the house drain, if the apparatus is near the house, and is not likely to give offense, for the draft is almost always inward at this point, passing up through the house drain. This settling tank being always full of







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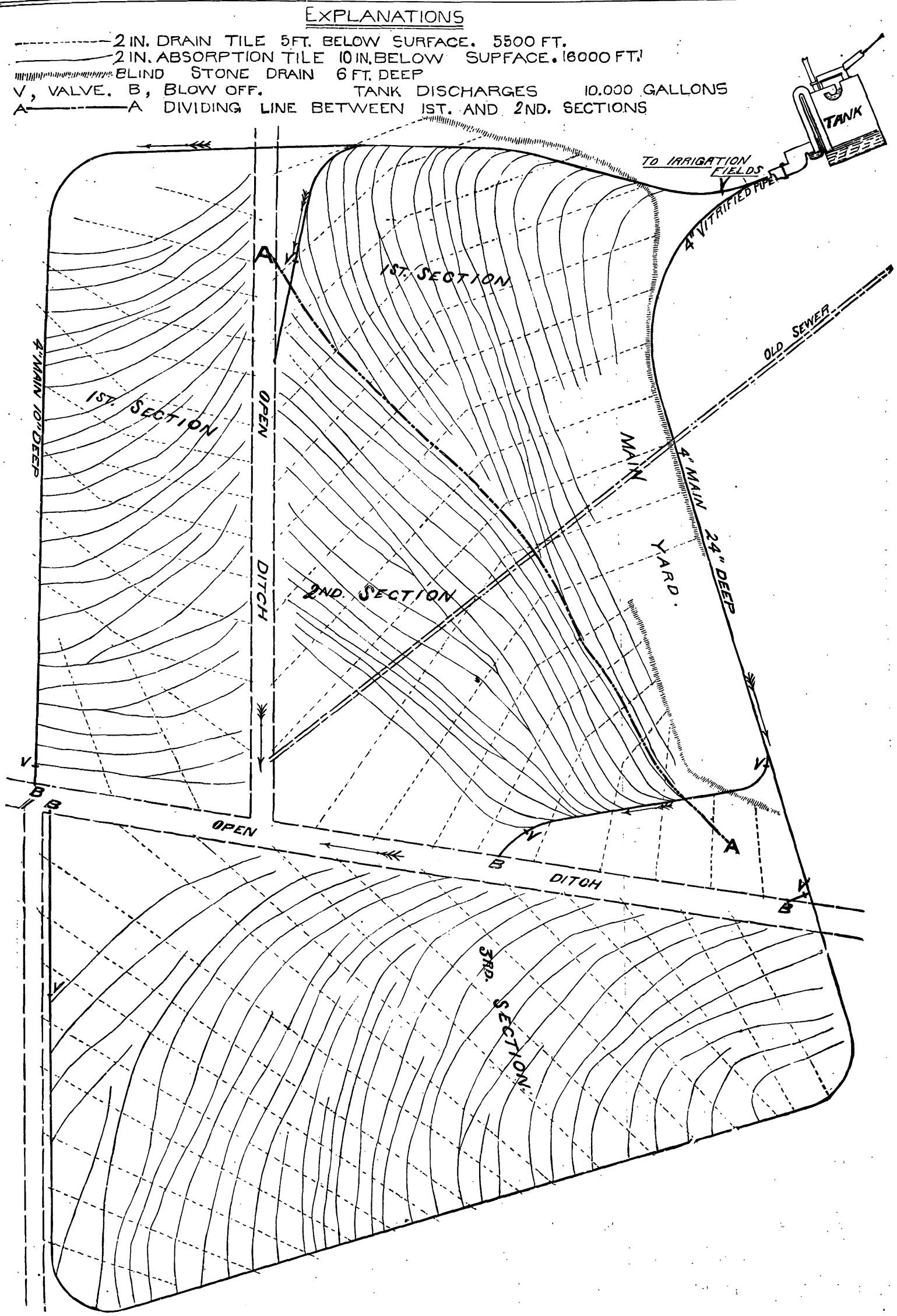

FLUSH TANK AND ABSORPTION TILE AS APPLIED TO THE DRAINAGE OF THE BRYN MAWR HOTEL (450 GUESTS), NEAR PHILADELPHIA.

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putrefying mass, should be made perfectly tight, and should be ventilated by an air hole as shown. This vent should be extended to a suitable place on the roof of a barn, stable or house, or up a large tree, where its gases will not give offense.

The connection between the settling tank and the flush tank should be by iron pipes built into the walls as shown, so that air can pass freely from one tank to the other at all times, and so that the overflow of the settling tank may not be from the surface or scum, nor from the bottom, but from a point about a foot below the surface.

Syphons are often constructed inside of the flush tank, but as it is best to have such apparatus easy of access at all times, a better way is to put the syphon outside, as here shown, and make a separate man-hole for getting access to it, whether the tank be full or empty. The syphon can be built of soil pipe, put together with lead.

It is found that a two-inch syphon is large enough for a single house or family. If made larger, it would require a more copious flow to start it than a single family might often give.

But in order to avoid friction, and thus give as rapid a discharge as possible, after it gets in action, the rising limb of the syphon is preferably made of four-inch pipe, with a reducer and a two-inch return bend at the top. Since the reducer might sometimes get choked with lumps of solid matter, it is always best to put a clearing screw at the top in the return bend. If made of thick casting, it can be tapped for the purpose, though a better way is to clamp a brass plate or saddle on top to receive the screw and make a red lead joint between saddle and pipe. The syphon is held in its place firmly by projecting brick as brackets while building the wall on either side of it, and similar projecting brick should be left in all the tanks as steps to be used in getting in or out for inspection. The interior of both the tanks should be plastered, and washed with hydraulic cement as high as the water line, and the iron pipes well bedded in cement mortar to make all tight and firm around them. These pipes should also be supported by stirrup irons built into the brick work as shown.

In order to make the syphon work well some care must be used in adjusting the level of its delivery above the bottom of the channel which drains it. The portion of the channel under the outlet of the syphon should be, for a 2-inch pipe, at least 2½ inches deep below the end of the pipe, and the bottom of the draining channel where narrowed up should be from ¼ to ½ an inch below the end of the pipe. This narrow part of the channel should not be wider than ⅜ of an inch at the bottom, smoothly formed, as shown in the section. If any rubbish should ever gather in it, a broom worked through the man-hole above would easily remove it.

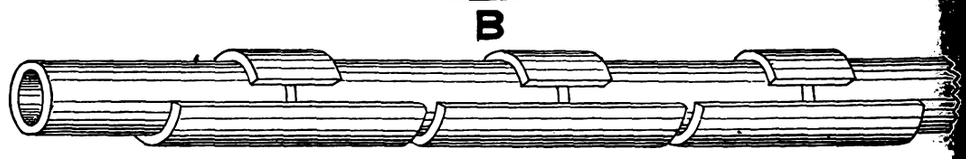
The outlet pipe from this apparatus should be four or five inch stoneware pipe for a 2-inch syphon. If over a hundred feet in length, and without a good inclination, say not over two feet in a hundred, the lager size is preferable.

The distributing pipes should be cylindrical, one foot in length, and two inches bore. The quantity needed varies somewhat with the porosity of the soil, and the size of the flush tank. The flush tank here shown contains 37.76 cubic feet, when filled. The pipe should be of sufficient length to contain about one-half this amount, say 19 cubic feet. Since the sectional area of 2-inch pipe is 3.14 square inches, it will require about 46 lineal feet of the pipe to contain a cubic foot. There should, therefore, be about 46 times 19, or 874 feet in length. If the soil is extremely porous, a smaller quantity would doubtless answer the purpose, since a larger proportion of the water would soak away while the syphon is discharging the tank.

These distributing pipes should be laid with a perfectly uniform slope of about six or eight inches in one hundred feet. If the slope exceeds this, the water may burst up at the lower end. They should not be covered more than eight inches in the clear below the surface of the ground. In order to combine these two conditions, the ground must be somewhat smoothly graded, and the lines for the trenches must be laid out so as to conform to the contour of the surface, *i. e.*, the lines of the trenches must follow nearly on contour lines, or lines which have a surface slope limited as above stated. The trenches may be at intervals of five or six feet, dividing the field in a gridiron fashion. If the lines are only one or two hundred feet in length, the width of the plot will be from forty to twenty feet to use eight hundred feet of pipe.

The branches where the 2-inch pipes leave the main drain should be so constructed as to allow the sewage to flow out from the bottom of the main into the branch, as shown in annexed section (A). They can be made rights and lefts, to suit the places where used, and can be either of the T or Y form. Ordinary branches are intended for combining two streams into one, but those are for dividing one stream into two. They should therefore be formed as shown in annexed drawings, having no hub on the small hole or branch, which simply abuts against the first 2-inch pipe, in the same way as the 2-inch pipes abut against one another.

The small porous pipes have sometimes been laid upon boards bedded in the trench to secure a more uniform gradient and prevent dislocation of joints, but as the boards soon go to decay and allow the pipe to be badly dislocated by settlement, it is better to provide terra cotta troughs to lay under the joints; each piece being a foot long and four inches wide outside, shaped to conform to the outsides of the cylinders, placing one piece under each joint with the hollow side upwards. Similar pieces about four inches long should be placed over the joints as covers, as shown in annexed drawings (B), to keep the sand out.

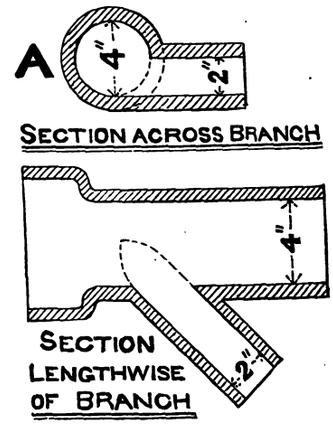


PERSPECTIVE VIEW OF UNGLAZED 2 IN. TILES WITH TROUGHS AND COVERS.

Of course, the plot selected for the distribution must be under-drained, either by nature or otherwise. Artificial drainage may be needed if the soil is likely to be saturated with water for any considerable time, *i. e.*, over one day or so at a time after heavy rains or during the rainy season.

The joints of the distributing pipe should be laid at least ¼-inch open. If laid closer they have been found to fill up with the solid particles of the sewage, and obstruct the soakage. Of course care should be taken not to disturb the position of the pipes in filling the trench. The lower end of the main should turn up into the air, to allow air to escape when the water rushes in. If this is in a place likely to give offense, it should be removed to a suitable place where free vent can be obtained without trouble.

It is often hard to convince workmen in our northern climate that the pipes should not be buried over eight inches. But if buried deeper the roots of the grass and the air do not get ready access to the sewage, and it is therefore disposed to accumulate, a result which we wish to avoid. Where laid near the surface no accumulation is found to take place, and the frequent flow of warm water from the house prevents the ground from freezing under and around the pipes if covered with sod.



BAD PLUMBING.

NEW YORK, *April* 27, 1883.

To the Editor of THE SANITARY ENGINEER:

In the house of a well-to-do Brooklyn resident, where I recently spent a night, my attention was drawn to an interesting little feature of the plumbing which I had never noticed before. Hearing a gurgling sound in the bathroom connected with my chamber whenever I heard water drawn in an adjoining room, I opened the door concealing the pipes under the basin and quickly saw the cause. The S-trap on the waste pipe had been pulled apart or stretched—probably to increase its length and save so much pipe—so that a seal of only about half an inch was left. Since there was no air pipe attached to the trap, and the waste pipe probably not extended to the discharge of a basin in an adjoining room into the same waste pipe, was quite enough to pull out nine tenths of the water the defective trap contained.

Very respectfully, your obedient servant,

[illegible]

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	[illegible]
May 12....	27 20	19.37	22.67	29 24	30 18	[illegible]

E. G. LOVE, Ph.D., *Gas Examiner.*

ESTIMATION OF HYDROGEN SULPHIDE AND CARBONIC ANHYDRIDE IN COAL GAS.

The *Chemical News* gives the following abstract of a paper on the above mentioned subject, read at a recent meeting of the Chemical Society, by Mr. L. T. Wright:

In the analysis of crude coal gas by absorbtiometric methods—as in Bunsen's, etc.—it is usual to term that portion of the gas which is absorbed by manganic peroxide, ferric oxide, etc., hydrogen sulphide; whilst that portion which is absorbed by caustic potash, and not by manganic peroxide, is usually designated carbonic anhydride. The author first gives some results obtained by absorption with a bullet of manganese peroxide and with KHO solution in a Frankland and Ward apparatus. Higher results were always obtained when the gases were absorbed successively than when they were absorbed simultaneously by using a solution of KHO. This difference between the results was considerably diminished by submitting the manganese bullet to a current of clean coal gas before using it for absorption. The author prefers the following method. The crude coal gas, dried and freed from ammonia by passing through phosphoric acid, is passed through two weighed U-tubes, the first charged with roughly powdered cupric phosphate in one leg and calcium chloride in the other, the second containing soda-lime (slightly moistened by exposure to the air for about 18 hours) and calcium chloride. The increase of weight in the first gives the sulphuretted hydrogen, in the second carbonic anhydride. The copper phosphate is prepared thus: Two pounds of ordinary phosphate of soda are dissolved in one gallon of water, and two and one-half of cupric sulphate in one and one-half gallons of water. The two solutions are vigorously stirred together, the precipitate washed by decantation, and dried at 100° C. Cupric phosphate thus prepared absorbs hydrogen sulphide very perfectly. Before

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using the absorption tubes, three cubic feet of clean, dry coal gas are passed through to "saturate" the re-agents. The gas during the absorption should be passed at the rate of quarter to half a cubic foot per hour. The total quantity must vary with the impurity of the gas. The sum of the hydrogen sulphide and carbonic anhydride thus estimated is always greater than the number obtained by absorbing these gases simultaneously in one U-tube charged with soda-lime. A six-inch U-tube charged with cupric phosphate will absorb 20 grains of hydrogen sulphide. A similar sized U-tube charged with soda-lime will absorb perfectly 18 grains of carbonic anhydride.

Dr. Armstrong suggested that some acetylen might be absorbed by the cupric phosphate.

The President asked if bisulphide of carbon vapor was absorbed by soda-lime.

Mr. Wright said that he did not think that the gain of weight was due to the absorption of acetylen, and in answer to the president, said that bisulphide of carbon was not absorbed by ordinary soda-lime from gas previously freed from hydrogen sulphide.

ELECTRIC LIGHT NOTES.

Quebec will soon be illuminated with electric lights.

Hell Gate is to have an electric light of 20,000 candle power.

Forty-two light-houses on the French coast are furnished with electric lights.

The Philadelphia papers are urging the lighting of Fairmount Park with electric lights.

The Light House Board will make experiments with the electric light, with a view of determining the value of the various kinds for light-house purposes.

The factory of the Bridgeport Organ Co. has 400 electric lights. These are run by the power disengaged after the stoppage of the heavier machinery at dusk, and are said to be cheaper than gas.

The action of the Commissioner of Patents in awarding the priority of invention for improvement in electric lighting to Moses G. Farmer, as against Starr and Peyton, has been affirmed by the Secretary of the Interior.

An electric light for deep-sea fishing adorns the new steamer Albatross, of the Fish Commission. When sunk beneath the water it attracts the fishes, and these are caught by a net which is drawn up from beneath it.

The Duke of Teck recently presented the prizes that were awarded to exhibitors in the International Electric Exhibition of 1882. This year the exhibition will be principally devoted to the consideration of gas in its application to domestic purposes.

The Volta prize of $6,000 will be awarded by the Academy of Sciences, Paris, in December, 1887, under the decree of June 11, 1882, for the discovery or invention of whatever shall render electricity applicable economically to one of the following objects: Heat, light, chemical action, mechanical force, the transmission of messages, or the treatment of sick persons.

Meter-ites.

The capital stock of the Cincinnati Gas-light and Coke Company has been increased from $4,250,000 to $5,000,000.

The report of the Bureau of Statistics of the Treasury Department for March shows that the export of petroleum and petroleum products for that month amounted to 36,309,101 gallons and $3,423,136, against 40,377,458 gallons and $3,753,706 for the corresponding month of 1882.

The following resolution has been introduced in the Brooklyn Board of Aldermen: "That the Commissioner of the Department of City Works be directed to cause the gas furnished to this city to be tested as to its illuminating power, in not less than fifteen different parts of this city, and transmit to this Board at its next meeting the result of said testing."

It has been decided to light up Port Said by compressed gas upon Pintsch's system. It is intended to have three fixed lights, each capable of burning two months without replenishing, and eight floating buoys, nine feet in diameter, which will also burn for two months without recharging with gas. There will also be three large holders for storing the gas under pressure and for filling the buoys.

At the annual dinner of the officials, Mr. Robertson, superintendent of the pipe-laying branch of the Gas Department of the Glasgow Corporation, gave some figures as to the supply of the city. Gas was first supplied to the public of Glasgow in 1818, but the meter system was not introduced till 1827, when the total manufacture was seventy-nine million cubic feet. When the undertaking came into the hands of the Corporation, the total production was 1,295,000,000 cubic feet, whereas last year it was 2,056,000,000 feet. The loss by leakage had been as steadily reduced year by year. In 1870 the loss of gas was twenty-two per cent. of the whole make, falling to twenty-one per cent. in 1872, to nineteen per cent. in 1874, to fifteen per cent. in 1880, to fourteen per cent. in 1881, while last year it was reduced to twelve per cent.

John K. Fisher, for many years Superintendent of the Service Department of the New York Gas Light Company, died on Saturday the 12th inst.

Correspondence.

RESPONSIBILITY OF A LANDLORD FOR THE RESULTS OF BAD PLUMBING.

CHICAGO, ILL., *April* 23, 1883.

To the Editor of THE SANITARY ENGINEER:

In a form of lease in use by the "Real Estate and Renting Agents' Association," of this city, the following is one of the articles of agreement between the landlord (the "party of the first part") and the tenant (the "party of the second part"):

"That the party of the first part shall not be liable for any damage occasioned by failure to keep said premises in repair, and shall not be liable for any damage done or occasioned by or from plumbing, water, gas, steam, or other pipes, or sewerage, or the bursting, leaking or running of any cistern, tank, wash-stand, water-closet or waste pipe in, above, upon or about said building or premises, or for any damage occasioned by water, snow or ice being upon or coming through the roof, sky-light, trap-door or otherwise; nor shall first party be liable for any acts or neglects of co-tenants or other occupants of the same building or of any owners or occupants of adjacent or contiguous property; and that....he....said second party will, without injury to the roof, remove the snow and ice from the same when necessary, and clean snow and ice from sidewalks in front of said premises."

Now, will this be binding in law? Supposing sickness or death be the "damage" occasioned by or from plumbing, might not the landlord be held liable for the results, even if the tenant had signed this agreement? The poor are to a great extent at the mercy of tenement house owners, and are almost forced to sign whatever terms an exacting and hard-hearted property owner may devise.

Respectfully, A HOUSE HUNTER.

[This form of lease, however objectionable it may be to the tenant, is undoubtedly binding. Primarily it is the duty of the tenant during his term to make repairs, and not of the landlord, as is commonly supposed. Hence, if the tenant sustain damage because of defective water pipes, roof, etc., it is attributable to his own neglect in suffering them to get "out of repair," and the landlord is not liable.

The rule, however, is somewhat different as to tenement houses. In these the landlord retains possession of the general sanitary appliances for the use of all the tenants, and since it would be impracticable for one tenant to make the repairs, which would benefit himself no more than all the other tenants, this duty is imposed upon the landlord, and his failure to make needed repairs would render him liable in damages for any injury sustained by a tenant in consequence of this neglect.

The right to claim damages from the landlord under such circumstances, the tenant may, however, by a stipulation, such as is inserted in the Chicago lease, agree not to enforce.

The terms of a lease are entirely matters of agreement. At times landlords are masters of the situation, and again the tenants hold the advantage, and secure leases upon terms more favorable to themselves.]

HEATING BY HOT WATER.

COLUMBUS, OHIO, *May* 1, 1883.

To the Editor of THE SANITARY ENGINEER:

In your issue of May 4, 1882, you published, with diagram, an article by me on Hot Water Heating for Private Houses, in which I detailed my own apparatus. You offered two criticisms of my apparatus, to which I now, after another winter's experience, am able to reply: (1.) After first filling the apparatus with water, the air *did* accumulate at *E*, in second story return bend, on starting the fire; but after opening the cock and letting this air out, there was no further accumulation, and can be none, as no more air can get into the water. (2.) As to the "miniature geyser" in the supply tank: Once during the winter, when the fire got unusually hot, steam formed somewhat rapidly, and produced a rumbling by blowing off under the water in the tank. Shutting the damper stopped this in less than a minute, and the experience was not repeated.

Indeed, a second winter's experience with my hot water heating finds me as well pleased with it as before, so that I would not now change any of the expressions of satisfaction which I used in the article alluded to.

Very truly yours, J. F. BALDWIN, M.D.

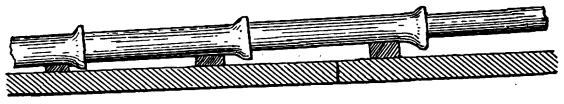
LAYING STONEWARE DRAINS.

To the Editor of THE SANITARY ENGINEER:

Laying a tile drain on soft ground, or newly filled land, is there any way a good foundation can be secured? Would it do to lay down 2-inch pine or cedar planks after the bottom of the trench is made to a true grade, putting a block under each pipe at the collar, and then filling under the pipe with cement?

Can the plan adopted by Col. Waring at Memphis, of putting the pipes on top of piles cut out to receive them, be applied to advantage?

[The method proposed, like all other methods, will fail to prevent the pipe from settlement whenever the material settles by which it is surrounded, as is generally the case in recently filled ground. Such settling does not occur



from the weight of the pipe itself, which is trifling, and no greater than the bulk of the earth which it displaces. The trouble arises from the slow and continued consolidation and settling of the whole mass.

Driving pile-bearings, as recommended by Col. Waring, would also be useless, unless driven *through* the filled material to a firm bottom, which is often impracticable.

But in ground which is merely *soft*, and not recently filled, the case is very different. All that is needed in that case is a platform as suggested, to avoid disturbing the pipe during the process of putting them together and filling in the trench. But unless the ground is permanently wet at all times of the year, the plank will decay, and when that happens the whole drain will be broken up by its unequal settlement. A better plan in ground that is sometimes dry, is to dry it by temporary drainage or pumping, and then pursue ordinary methods.]

GALTON FIRE-PLACE.

PHELPS, N. Y., *May* 4, 1883.

To the Editor of THE SANITARY ENGINEER:

Your correspondent, F. F. C., will find description of Capt. Galton's Ventilating Fire-place, at page 298, of Smithsonian report, for 1873. Arthur Morin's paper on Warming and Ventilation, a translation of which appears there, contains information of great value. G. W. R.

POLLUTION OF CELLAR FLOOR.

BROOKLYN, *April* 18, 1883.

To the Editor of THE SANITARY ENGINEER:

Last winter the water pipes and the soil pipe in my house in Brooklyn burst, and after some days we accidently discovered that water closet filth had leaked down and saturated a large place in the cellar bottom, which is simply the natural soil, not cemented, nor even floored over. Now that warm weather is coming on, I am afraid of consequences and think of moving out. I have taken dry clean earth and spread over the saturated place, and that has seemed to purify the air. Is there anything else to be done? Are there any disinfecting substances which can be tried with success, or must the cellar be dug out? I may say that the landlord of this house will do nothing if not compelled to. It was only when the plumber whom he hired refused to patch up the pipe and insisted on putting in a new one, that he would have it done. J. W.

[We should remove the foul earth and replace with new.]

A CORRECTION.

BOSTON, MASS., *May* 5, 1883.

To the Editor of THE SANITARY ENGINEER:

In your issue of May 3, 1883, on page 512, Mr. Hall's figures in tables V. and VI. should be given as "grams" not as "grains." W. R. N.

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DR. CHANDLER AND THE NEW YORK HEALTH DEPARTMENT.

The aldermen having rejected the mayor's recent nomination of Dr. Chandler for a third term as President of the Health Department, and an effort having been inaugurated to induce them to reconsider their action, THE SANITARY ENGINEER has deemed it of interest to its readers to present a brief outline of the more important services which this department has rendered during the few years of its existence.

In 1866, Prof. Charles F. Chandler was invited by Dr. Harris, of the Metropolitan Board of Health, to make scientific studies of sanitary questions affecting the health of this city. There was no appropriation for the purpose and the work was performed gratuitously. The commissioners were so well satisfied of the importance of the work that at the end of the year they created the position of chemist to the Board of Health for Dr. Chandler, a position which he held until 1873, when he was appointed President of the Board of Health, by Mayor Havemeyer. In 1877, Mayor Ely re-appointed him, and his second term expired the first of May of the current year.

Among the subjects to which Dr. Chandler devoted special attention while chemist to the Board of Health were: the food and water supply of the city, adulteration of liquors, poisonous cosmetics, kerosene accidents, and the gas nuisances.

MILK SUPPLY.—Numerous analyses of the milk sold in the City of New York have established the fact that this important article was shamefully adulterated, and that on the average at least 33 per cent. of water was added to the original milk, while a considerable part of the cream was often removed. It was also found that most of the condensed milk companies skimmed the milk before concentrating it. The total frauds of milk-men amounted to about $10,000 per day. The Metropolitan Board did not attempt to grapple with this evil, but as soon as Dr. Chandler was made president he initiated a successful warfare upon dishonest dealers, assuming that as milk was the chief diet of the 130,000 children in New York under five years of age, it was the most important article for sanitary supervision. The milk dealers organized an association, and secured legal and chemical assistance, attacking both the law and the chemical methods employed. After several test cases had developed all the facts the Court of Appeals affirmed the laws, and the best chemists in the country indorsed the methods. About $40,000 has been paid into the city treasury as fines by offending milk-men, and quite a number of them have spent from ten to ninety days in prison.

KEROSENE ACCIDENTS.—One of the most successful investigations was that of kerosene accidents, which were of very frequent occurrence wherever this oil was used. As it was of recent introduction, very little was generally known of its chemical nature, and it was supposed that the accidents were unavoidable, and were due to peculiar and inherent properties of the oil. Kerosene came in as a substitute for camphene or burning fluid, which was inherently dangerous, and could not be made safe. Kerosene was supposed to be similar to camphene in constitution and properties, and the accidents were generally attributed to carelessness.

In 1869 Dr. Chandler began to investigate and write upon this subject. His first report, dated January 11 of that year, was a simple statement of the chemical nature of petroleum, and its mode of manufacture, and pointed out the fact that its dangerous character was entirely due to a small percentage of inflammable naphtha left in by the refiner to save a trifling percentage of profit. It also contained the statement that of 78 samples of oil purchased from retail dealers in New York City, not a single one was safe, while many were pure naphtha sold under the name of "safety oil." This paper was extensively reprinted and was made the basis of legislative action in various parts of the world. A fuller statement of the subject was published in July of the same year, a third paper in 1870, and a very elaborate report in 1871. These papers were reprinted in whole, or in part, in England, France, Germany, and Switzerland, and Dr. Chandler was invited in 1872 to appear before the select committee of the House of Lords, in connection with this subject.

GAS NUISANCES.—For years a most intolerable odor prevailed over large areas of the city, at one time on the east side, at another time on the west side. The odor was generally attributed to the sewers. When it was clearly established that it came from the gas works the companies were appealed to, and with one exception they modified their processes so as to suppress the odor, the immediate cause of which was found in the foul lime which was daily removed from the purifiers. One of the companies declined to pay any attention to the suggestions of the board, claiming that it did not produce any odor; that the odor was not disagreeable; that it was good for whooping cough; that its production was inevitable; and that if the company did not produce the odor the gas would be so impure that it would not be safe to burn it in dwellings. The company, therefore, joined issue with the Board, and a long trial before a referee was the result. The gas company attempted to sustain its assertions by the aid of gas engineers and chemists, but the board successfully combated them, and a decision was given against the company. The necessary changes were made and the gas nuisance ceased. The evidence taken in the case was published in the report of the Board for 1869.

THE NEW BOARD OF HEALTH.

Under the charter of 1873, the present Board of Health was organized, and it has now been in existance for ten years. The Board consists of four members, viz., the Health Officer of the Port, the President of the Board of Police, and two Health Commissioners, one of whom is a practicing physician. There have been since the organization in 1873, two Health Officers of the Port, Dr. S. O. Vanderpoel, and Dr. William M. Smith; five gentlemen have filled the office of President of the Board of Police in this period, Henry Smith, Hugh Gardner, George W. Matsell, Gen'l Wm. F. Smith, and Stephen B. French. There have been three medical commissioners of health, Dr. Stephen Smith, Dr. Edward G. Janeway, and Dr. Woolsey Johnson. Dr. Chandler has held the other Health Commissionership during the entire period.

These men, says Dr. Chandler, have always worked together in entire harmony, and it is a noticeable fact, that there has never been a disagreeable word spoken by one of them in the entire ten years and a negative opposition vote has never been recorded, with a single exception.

The efficiency and success of the present Board has been largely due to its good fortune and good judgment in securing its faithful corps of officers, sanitary inspectors, engineers, etc.

Col. Emmons Clark, the Secretary; Col. W. P. Prentice, the Attorney and Counsel; Dr. W. De F. Day, the Sanitary Superintendent; Dr. Edward H. Janes, the Assistant Sanitary Superintendent; Dr. James B. Taylor, the Chief of the Vaccinating Corps, and most of the sanitary inspectors, have been with the Board ever since its organization in 1873, and its success in grappling with the causes of disease has been largely due to their ability and activity.

In the selection of clerks and other subordinates, a civil service system, with examinations, was adopted, and every appointee has been made to understand that as long as he faithfully performed his duties he would be secure in his position. The effect of this system on the *morale* of the department has been of great value.

STENCH NUISANCES.—As soon as the board was organized, it began active warfare upon the stench nuisances, which made the air of the city at times intolerable. The first attack was upon the New York Rendering Company, which had a contract with the city for the removal of offal and dead animals beyond the city limits; instead of complying with the terms of the contract, the offensive material was rendered at the foot of West 38th street. The company was directed to at once stop rendering, and carry the material from the city. At first they claimed this was impossible. But when policemen were placed on the dock, with orders to arrest the workmen if they attempted to continue the work, the company placed the material on a vessel, carried it down the bay, and threw it overboard. As most of it floated ashore, it became the cause of equal offense in new localities. As the company insisted it must either "render or dump," the Board declared the contract violated, and made arrangements with different parties to carry all the material to Barren Island. The arrangements have been in force ever since, with entire satisfaction.

The Rendering Company, still retaining possession of the dock at the foot of 38th street, placed every obstacle in the way of the new contractors, and it became necessary to seize all their movable property, put it upon their two hulks which had been tied to the pier and tow them over to the New Jersey shore. This resulted in a suit for over $100,000, in which the board was successful.

The next attack was upon the vessel Algonquin, which lay at the foot of 39th street, and on which offal from slaughter houses were rendered. Orders was issued requiring the owners to discontinue the business; they resisted and finally moved out into the stream and carried on the work out of reach of the inspectors. The first encounter was a night attack upon the trucks engaged in carrying the offal to the end of the pier for delivery to the vessel. This failing to put a stop to the business, a steam tug was employed, and the Algonquin towed to Barren Island and tied up; the business now came to an end. A gut cleaning establishment at the foot of West 39th street next received attention, and the Board finally sent a gang of laborers and tore down the building and burnt the materials. The melting and lard rendering were sharply followed up, until every establishment engaged in the business was either suppressed or compelled to introduce improved machinery by which the business was rendered inoffensive.

SLAUGHTER HOUSES AND CATTLE DRIVING.—Originally the slaughter houses were scattered all over the city. The Metropolitan Board of Health moved them all up town, but, unfortunately, permitted them to settle in localities which in a few years became so extensively occupied by dwelling houses that the old evils again appeared. The new Board undertook a radical reform in the whole business. It began to encourage the building of a few large abattoirs, to take the place of the 52 slaughter houses on the island. The Cortland Palmer estate converted Manhattan Market, at the foot of West 34th street, into a well appointed abattoir. A company was organized to build a second abattoir at the foot of West 59th street, near the cattle yards, and on the East side the owners of slaughter houses had been brought to the point of arranging to construct an abattoir at the foot of 43d or 44th street, for their joint use. The scheme seemed to be on the point of consummation when a most unexpected opposition arose on the part of the managers of the Roosevelt Hospital and certain real estate owners west of Central Park. As the intentions of the Board were not fully understood by the public and the press, the opposition became so decided that the capitalists who proposed to erect the abattoirs were deterred from making the necessary investment. This plan which would have resulted in placing the whole business of slaughtering animals for food, the handling of the fat, blood and offal, in large establishments, with the best machinery, and at the same time would have made it possible for the health authorities to inspect every animal before it was killed, had to be abandoned. The Board then turned its attention to improving the present system, as far as practicable, and the badly constructed and imperfectly drained slaughter houses were condemned, as well as those situated in the immediate neighborhood of tenement houses. At present the business is restricted to a few blocks on the East River, east of First avenue, and to a few blocks on the Hudson River, to the west of Eleventh avenue, and is conducted with as little offense as practicable.

For a time the driving of cattle across the city was permitted, but the citizens protested so loudly against the annoyance and danger resulting from it that the Board was compelled to forbid it. For the last two or three years the cattle have been transported in boats, but during the past winter the west side slaughter houses have succeeded in securing the enactment of a law to permit them to drive cattle on Eleventh avenue, notwithstanding the protest of the Board of Health.

For years it was customary to allow the blood from the slaughter houses to run in the street gutters, through the sewers and into the rivers. This was forbidden by the Board of Health, and at its suggestion drying machines were introduced, by which the fresh blood is converted, without offense, into a dry powder, which is very valuable as a fertilizer.

STABLE MANURE.—It had been customary for years to accumulate stable manure at the foot of West 38th street and at the foot of East 45th and 90th streets. Huge piles of this material were stored at these points, soaked with water when it rained, and under the rays of the sun fermented and putrefied. The owners caused the piles to be turned over from time to time to prevent burning. Months were required to get it into proper condition for sale to farmers in the spring. The stench emitted was often intolerable. No subject has given the Board more trouble than this. When the Board refused to permit the storing of the manure, the contractors refused to take it from the stables, and the nuisance was transferred to thousands of

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localities throughout the city. Finally, after years of litigation, the Board succeeded in making arrangements by which it was no longer necessary to permit the material to be stored in the city limits. During the past winter a law passed both branches of the State Legislature and is now in the Governor's hands, by which the Board of Health will be prevented from interfering with the storing of this material within the city.

NIGHT SOIL CONTRACT.—When the Board came into existence it found very inadequate arrangements for the removal of night soil. A contract had been made by which the city, for the sum of $4,000 per annum, agreed to deliver all the night soil collected by scavengers from the 28,000 privy vaults of the tenement houses to the Lodi Works on the Hackensack River. The parties interested in these works secured the contract for carrying the material to the Hackensack at a cost to the city of $50,000 a year. The work was performed in a very slovenly manner and caused considerable annoyance. One of the first acts of the Board was to break up this arrangement, declare the contract violated and place the work in new hands at greatly reduced expense. The result was a suit for $300,000 against the city which the Board successfully defended.

PETROLEUM REFINING.—There was one petroleum refinery in the city on the Hudson River at 60th street, from which offensive emanations spread over the upper part of the island. After many fruitless efforts to induce the company to carry on the business in an inoffensive manner, the Board was compelled to drive the business out of the city; one of the few cases—there being, we understand, but two others—in which it was not possible to secure the introduction of improved processes and machinery into offensive establishments, and thus permit them to remain in the city.

SUBURBAN NUISANCES.—After the offensive trades carried on in the city had been brought under control, it was found that very offensive odors still continued to cause great annoyance on the east side of the city. Careful investigation showed that these odors were chiefly caused by a few fertilizer factories at Hunter's Point and Green Point, in which the sludge acid of the petroleum refineries was employed in the manufacture of super-phosphates. After every effort had failed to induce the local authorities to put a stop to the nuisances, and after it had been found impossible to induce the Legislature to enact a law for the suppression of nuisances, which originating in one locality produce their evil effects in other localities having no jurisdiction over them, an attempt was made to reach these factories under a special act designed for another purpose. The Board had secured the necessary evidence with great difficulty, fixing the nuisance at particular times upon each of the factories, and was engaged in prosecuting them, when the farce of indicting the members of the Board by the Grand Jury was enacted. While officers of the Board were prosecuting the real offenders at one end of the Court House, the Grand Jury were indicting them at the other, the Grand Jury insisting that the odors complained of originated in the factories in New York, which the Board had failed to suppress. When the Board secured a hearing on the indictments Judge Sutherland quashed them.

MARKETS.—One of the first acts of the new Board, in 1873, was the destruction of the two-story structures which covered half the roadway of the public streets adjacent to Washington Market, almost surrounding the block and interfering with the traffic in these thoroughfares. Many attempts had been made to remove them, but without success. They were in a filthy condition, and great quantites of garbage had accumulated beneath them, giving rise to offensive odors, and tending to taint all the food supplies exposed for sale in the market. After exhausting peaceful methods, the Board decided to resort so force. One hundred and fifty carpenters and laborers, 300 policemen, and a corps of surgeons, in anticipation of forcible resistance, were one evening led by Dr. Chandler to the market, and before morning the buildings were leveled, the materials carted away to the corporation yards, and the pavements, which had not had the light of the sun for 20 years, swept clean. A suit was brought in consequence against the city for about $60,000, but was successfully defended. Similar action was taken with the stalls around Fulton, Centre and other markets.

CONTAGIOUS DISEASES.—In 1874 the Legislature directed the Board to assume control of contagious diseases, and the hospital at the southerly end of Blackwell's Island was placed in its charge. This hospital had been so managed as to create a prejudice in the minds of the public, which led to the concealment of cases of contagious diseases from the authorities, through fear that the removal of a patient to the hospital would insure death. The first step of the Board was to change the name to Riverside Hospital in place of small-pox hospital; secondly, they secured a corps of sisters of charity to act as nurses, together with competent resident physicians.

The third step was the purchase of a handsome coupé for the conveyance of the sick. In a few months, as a result of these measures, says Dr. Chandler, the prejudice against the hospital disappeared, few cases were concealed, and a material reform was effected.

A corps of vaccinators was established, and systematic house-to-house vaccination was resorted to, and has been since maintained. To remove the prejudice against humanized virus, a vaccine farm was established and bovine virus was exclusively used. About 500,000 persons have been vaccinated gratuitously since the system was inaugurated. There has been little small-pox in the city, notwithstanding that there has been an alarming amount of it in other localities.

A system of disinfection has also been established in connection with a disinfecting corps, so that these measures also can be applied to prevent the spread of contagious disease. The system adopted by the Board has met with favor, and has been adopted by the New York State Board of Health, the National Board of Health, the city of Rome and the Kingdom of Belgium.

THE SUMMER CORPS.—Owing to peculiarities of our climate we suffer during the latter part of July and early part of August the most distressing weather, when the atmosphere is at high temperatures, with excessive humidity. The weather is particularly unfavorable to children, and often results in adding several hundred deaths to the ordinary death rates. In one week the rate has been known to rise from 500 to 1,500, nearly 1,000 children falling victims to the diarrhœal diseases induced. In order to reduce as far as possible this excessive mortality, a summer corps of fifty physicians is employed, one being allotted to each of the fifty districts into which the tenement house regions are divided. It is his duty to visit every room in his district, treat all sick children, furnish necessary medicines, give advice to the mothers, place in their hands instructions for the the care of infants, printed in English and German, and distribute tickets for excursions on the barges of St. John's Guild. As an illustration of the work accomplished, we are informed that the physicians of the summer corps made 130,000 visits in one month, at a cost to the city of $5,000. The good effects of the work enabled the Board to secure each year an appropriation of this sum to continue the work; this year the appropriation is $10,000, and the corps will be employed for two months.

TENEMENT HOUSES.—Statistics having shown that two-thirds of the deaths occur in that half of the population which resides in tenement houses, efforts have been made to improve the condition of these structures, and a large part of the labor of the Department has been directed to their inspection and reconstruction. Although much was thus accomplished, it was found that they were constructed on plans which made it impossible to secure light and ventilation by any practicable changes. With a view to a radical improvement in the condition of tenement houses, THE SANITARY ENGINEER, with the aid of a few public spirited citizens, offered prizes for plans for improved tenement houses. These plans were carefully considered by a committee, of which Dr. Chandler was chairman, and prizes were awarded. Public meetings were held, the Sanitary Reform Association was organized, and, working in conjunction with the health authorities, secured the enactment of such amendments to the Tenement House Act as gave the Board of Health complete control of all tenement houses to be thereafter erected. This law went into effect about three years ago, and since that time every tenement house, apartment house and lodging house has been constructed upon plans previously approved by the Board of Health. In this period, it is believed, accommodations have been provided in new structures for nearly one hundred thousand persons, and in every case adequate means for light and ventilation have been provided. This result has not been secured without some litigation; but as the Board has been sustained by the Courts as well as by public opinion, builders and architects, with few exceptions, have complied with their requirements.

PLUMBING AND DRAINAGE.—A large part of the work of this Board has been the inspection of the plumbing and drainage of dwelling houses. It has been generally found that many serious defects existed by which emanations from the sewers, often carrying germs of disease, find access to living and sleeping rooms. Not only was the work defective in execution, but it was generally found to be radically faulty in principle, and the Board undertook experiments to ascertain the modifications of the system which would remedy the evils. A model of house drainage was erected at the Board of Health rooms upon which experiments could be made, and which served to demonstrate the imperfections of the system generally employed. It was thus readily shown that no house was safe from sewer gas unless the soil pipe was carried through the roof, a trap placed between the house and the sewer and an inlet for air provided inside the trap, a proper trap placed under every fixture, every trap vented to prevent syphonage, and over-flows, refrigerator and safe wastes disconnected from the sewer. So apparent were these improvements, that the Sanitary Reform Association secured the enactment of a law for the registration of of plumbers and for placing the control of plumbing and drainage in all new buildings in the hands of the Board of Health. The law went into effect June 4, 1881, and since that time the plumbing and drainage of every building erected in this city has been in accordance with a plan previously approved by the Board of Health. The rules adopted by the Board were matured after consultation with the best plumbers, architects and sanitary engineers, and have proven so satisfactory that they have been adopted by many other large cities.

IMPROVEMENT IN THE PUBLIC HEALTH.—"No one," says Dr. Chandler, "could doubt for a moment that such comprehensive sanitary work, over a period of over ten years (and in fact, begun by the Metropolitan Board of Health in 1866), should make a great improvement in the health of the city." The ordinary method of comparing vital statistics by the death rate per 1,000 of population is considered defective by the New York City authorities, and as leading to very erroneous conclusions, since it depends, first, on an exact record of the number of deaths, and second, on an exact enumeration of the population, and there are many localities in which neither factor can be obtained with accuracy. There is always danger that the death returns will be imperfect, depending on the voluntary report of sextons and undertakers, and the population is generally over-estimated. In some American cities, the population, on which the death-rate is estimated, is 15 or 20 per cent. greater than it actually is. To obtain a more reliable method of comparing death rates, the Board of Health has compared the deaths among themselves.

In 1866, of every 100 deaths in the city, 53 were of children under five years of age, while 47 were of persons over five years. The efforts at sanitary improvement, together with the increased intelligence secured by the efforts of the sanitary authorities, the sanitary organizations and the press, have succeeded in reducing this ratio, year by year, until now, of 100 deaths, only 46 are under five years of age. If we compute the effect of this change, it will be seen that 5,000 children are saved per annum in this city, without claiming any reduction in the death rate of persons over five years of age. As there is no reason to suppose that the improvement is limited to the children, it is, in the opinion of the Board of Health, no exaggeration to estimate that at least 8,000 lives are saved every year, as the result of these sanitary reforms. For each death, there are 28 cases of severe sickness, and thus the amount of good accomplished becomes enormous.

PROJECTED IMPROVEMENTS.—At the present time the Board is engaged in erecting hospitals for contagious diseases on North Brother's Island. In the autumn, the Riverside Hospital on Blackwell's Island will be abandoned, and all cases of contagious diseases will be transfered to the new hospitals on North Brother's Island.

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In addition to this, a site has been secured in East 16th street, and work will be begun at once upon a hospital for scarlet fever and diphtheria.

STATE BOARD OF HEALTH.

Three years ago a State Board of Health was established and the President of the City Board became a member and chairman of the Sanitary Committee. The two boards have acted in harmony and have been of great assistance to each other. A law was enacted forbiding the adulteration of foods and drugs throughout the State. Another law was also enacted, prohibiting the sale of dangerous kerosene. As the enforcement of both these measures required a knowledge of practical and analytical chemistry, it has been intrusted to Dr. Chandler of the Sanitary Committee. Public analysts have been appointed, and samples of foods, drugs and oils have been collected in various parts of the State. A few test cases have been tried under the food and drug act, and one test case under the kerosene act, and arrangements are now nearly completed for the enforcement of these acts in every part of the State.

THE MAGNITUDE OF THE WORK.—At the present time it is probable that there is no other city in the world which has so complete a sanitary organization as New York. The inspection, vaccination, engineer, disinfection corps, clerks, nurses etc, number 125 persons beside 50 physicians and the extra corps of disinfectors and fruit inspectors employed in the summer, and the permanent corps of 30 sanitary policemen. Appropriations for the current year, including moneys to be expended on the hospitals, amount to $500,000.

COVERED SERVICE RESERVOIRS.

At the meeting of the Institution of Civil Engineers on the 20th of February, Mr. Brunlees, President, in the chair, a paper was read on "Covered Service Reservoirs," by Mr. William Morris, M. Inst., C.E., of Deptford.

The author alluded to the fact that covered reservoirs were used by the Romans and other ancient people for keeping water cool and pure for potable purposes, and showed that their use was by no means a recent refinement, although they had only lately been introduced in modern water works. It did not appear, from official returns, that covered reservoirs were used in London in 1850, when filtration had only been partially introduced. But it soon became evident that covered reservoirs were necessary for the storage of filtered water, and accordingly it was enacted by the Metropolis Water Act, 1852, which required all water (except water pumped from wells) to be filtered, that all reservoirs for filtered water within five miles of St. Paul's cathedral should be covered. This enactment was more particularly intended to preserve the water from contact with the smoke of London; but the objection to uncovered reservoirs was by no means confined to the neighborhood of large towns, as owing to the rapid growth of vegetable and animal life in service reservoirs, the improvement from the filtration of the water was rapidly lost, especially during the summer. As examples, the author referred to the uncovered reservoirs constructed at the cost of the Admiralty in Greenwich Park and on Woolwich Common, for the protection, in case of fire, of the Greenwich Hospital, Royal Dockyard, and other Government establishments, which were partially used by the Kent Water Works for the supply of their district. The author then proceeded to describe the covered reservoirs at Plumstead and at Shooter's Hill, purchased by the Kent Company. These were covered by brick arches, springing from cast iron girders. Then followed descriptions of different works, including the Chislehurst Reservoir, which was built of brick, covered with arches supported by cast iron girders, and rendered internally with cement. The circular reservoir purchased from the Dartford Local Board of Health was covered with brick arches supported on nine wrought iron joists radiating from the centre, where they were supported by a cast iron column. The circular reservoir in Greenwich Park consisted of brick arches, resting on concentric rings of rolled wrought iron girders supported by piers. The filter-beds at Deptford were converted into covered reservoirs, consequent on the Kent Company abandoning the supply from the river Ravensbourne in favor of spring-water from the chalk, in which case the old filtering material was utilized in the construction of the concrete vaulting. The covering of a small reservoir at Plumstead with Bunnett's flooring was described, and the construction of a covered reservoir on Woolwich Common in lieu of the old one referred to, when relinquished by Government. This was an oblong reservoir 200 feet long by 100 feet wide; the walls were of concrete faced with brick; the covering arches were of brick, springing from rolled joists supported on brick piers. The above works were designed by the author's father, the late Mr. W. R. Morris, M. Inst., C.E.

The author then described the New Cross Reservoir, built under his direction in 1874, which was similar to that on Woolwich Common, except that the roof consisted of brick arches springing from the piers instead of rolled joists. He then gave a full description of a reservoir recently constructed by him at Farnborough, Kent, in which the outer walls were reduced to a minimum, by supporting the covering arches till their springing was level with the centre from which they were struck. This system was adopted for the end as well as for the side walls. An account was given of a slip which occurred during the construction of the reservoir, and of the means taken for making the work secure.

The East London Water Works Company had at Hornsey Wood a fine brick reservoir which was capable of containing 5,000,000 gallons of water. The same company had at Haggar Lane a reservoir capable of containing 1,500,000 gallons. This also was built of brick; the vaulting was supported by longitudinal walls, stiffened by transverse walls, so that the reservoir was divided into 49 sections, the walls of which were pierced with circular openings. The Kilburn Reservoir, capable of containing 6,000,000 gallons, was a fine brick structure, with vaulted roof, supported on cruciform piers; the outer walls were supported by buttresses against the pressure of the external earth. The Hampton Reservoir, capable of containing 2,750,000 gallons, was constructed entirely of concrete. This reservoir was built in clean, sharp gravel, and the excavated ballast was admirably adapted for the concrete. The arches sprung from wrought iron joists. The Burton-on-Trent Reservoir, built for the South Staffordshire Water Works, had a capacity of 4,000,000 gallons; it was rectangular in plan, and was covered with brick arches springing from cast iron girders, supported on cast iron columns; the walls were of concrete, faced with Staffordshire bricks.

The author then referred to several service-reservoirs, of which he had the opportunity of learning some particulars during a recent tour. The Charlottenburg Reservoir, of the Berlin Water Works, with a capacity of 5,000,000 gallons, was built of brick, with walls sufficiently thick to resist the internal pressure of the water; the soil was fine, loose sand, on which bitumenized paper was spread before laying down the concrete foundations. The Berlin filter-beds were covered with Bohemian vaulting, the foundation of which rested on gravel puddle. The reservoir at Breslau, capable of containing 900,000 gallons, was supported on a tower 130 feet high, and the tower contained the pumping engines. The author then described one of the Vienna reservoirs, and furnished some notes on the aqueduct which supplied that city. The water works of the city of Munich, which were in course of construction at the time of his visit, comprised a reservoir having a capacity of 8,800,000 gallons; the walls and floor were of concrete, the vaulting was semicircular, built with one ring of brick. The author gave a sketch of the Frankfort Reservoir, and some notes as to the water supply of the city. The reservoir and works of the Darmstadt water works were noticed; the reservoir was of brick, built above ground; it was capable of containing 900,000 gallons; the water was pumped from six tube-wells, sunk in the sandy plain between the Odenwald mountains and the Rhine at Griesheim, about five miles from the city. The reservoir at Cologne, which consisted of a cast iron tank, with a capacity of 800,000 gallons, was erected on a tower 100 feet high; the water supplied to the city was pumped from wells on the banks of the Rhine; but the spring water was quite distinct from the Rhine water. The Dresden Reservoir was capable of holding 4,600,000 gallons of water. The Hanover Reservoir, with a capacity of 2,400,000 gallons, was of brick. It stood 30 feet above the ground line, and the outside walls supported the full pressure of the water without the assistance of any embankment.

After some remarks on the marked preference of Germans for spring-water as compared with lake-water or river-water, the author concluded the paper with a sketch of his idea of a model service reservoir. This was so arranged that the earth dug from the excavation was all utilized in forming the necessary embankment. The floor and the side walls were of concrete, the piers, arches and vaulting of brick. The vaulting was similar to that of the Farnborough reservoir, but the ends of the vaults were brought down with a curve of 12 feet, six inches radius, till they rested on correspondingly curved bays in the concrete end walls. By this construction the thrust of the roof would be carried down to an abutment resting against undisturbed ground, and the pressure of the water on the reservoir would not only be supported by the abutment but be also counterbalanced by the weight of material facing the embankment, which rested on the extreme arches of the reservoir, in addition to the pressure of the earth which would have to resist internal pressure if the walls were vertical. The author held that the whole of the interior surface should be rendered in cement mortar. —*Building News.*

LIVERPOOL CORPORATION WATER WORKS. WASTE WATER DEPARTMENT.

Number of inspections made and defects discovered by the Waste Water Inspectors during the year ending 30th December, 1882:

Number of first inspections, 131,329; pipes visible, 2,310; hidden, 2,471. Defects discovered: Draw-off cocks and stop-cocks, 10,600; ball cocks in storage cisterns, 2,204; water closet appliances, 10,399; total, 31,984. Number of defects reported by inspector, 10 418.

(*a*) These inspections do not include re-examinations for the purpose of ascertaining that defects discovered by the inspectors have been repaired in accordance with the notices served upon the persons responsible for the maintenance of the fittings. Two special inspectors are employed upon these re-examinations, and in inspecting new plumbing work.

(*b*) The "hidden" leakages are underground defects discovered by night soundings, and which could not be found by ordinary or superficial inspection.

(*c*) These are defects repaired by the inspectors in the ordinary course of their examinations, and are included in the total number of defects discovered.

J. PARRY.

WATER DEPARTMENT, MUNICIPAL OFFICES, LIVERPOOL, *March*, 1883.

Reviews of Books.

TWENTY-NINTH REPORT UPON THE BIRTHS, MARRIAGES AND DEATHS IN THE STATE OF RHODE ISLAND, for the year ending December 31, 1881. Prepared by Charles J. Fisher, M.D., State Registrar of Vital Statistics. 157 pp., 8 vo. Providence, 1882.

This is a valuable public document, being one of the very few State registration reports of this country which can make any pretence to accuracy and completeness.

Not that complete data have been obtained, but at least there is a respectable approximation to such, and there is an improvement in this respect upon previous returns. The number of births registered during the year was 6,761, of which 264 were still born; the number of marriages was 2,750, and of deaths 5,016. This gives a death rate of 18.1 per thousand, as against the rate of 17.5 in 1880; but this is on the supposition that the population in 1881 was the same as that shown by the census of 1880, which is of course incorrect.

The city of Providence contains about 38 per cent. of the population of the State, and its death rate in 1880 was 19.8 per 1,000, while the rate for the rest of the State was 16.0 per 1,000, being probably about two per thousand too low, owing to incomplete returns. Dr. Fisher seems to have made no attempt to estimate the population for 1881, but has calculated all his percentages on the population of 1880, so that these percentages are not properly comparable with those of other State reports.

It is true that the increase of population in this State is comparatively slow, being in 1870 217,353, and in 1880 276,531, and that the returns are so incomplete that even with the smaller population of 1880 the ratios are still no doubt too low, so that the matter is not one of practical importance.

The diseases which stand at the head of the list as having caused the greatest namber of deaths during the year are as follows: Consumption 706, pneumonia (including congestion of the lungs) 327, diseases of the heart 203, old age 247, cholera infantum 240, diphtheria 216. Dr. Fisher remarks that "more than one-quarter of all the

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deaths that occur in Rhode Island are caused by diseases of the lungs and respiratory passages. Of these consumption is by far the most destructive. It has stood at the head of the list of the most prominent causes of death during the whole period of registration."

Of the 706 decedents from consumption, 429, or 60.8 per cent., were of foreign parentage. The report contains a careful and interesting study of the statistics of consumption in the State, which is too long to be given here, and which cannot be summarized. We commend it for examination, both as to its matter and its form. The mortality from consumption in Rhode Island has been steadily diminishing for the last 17 years—but the lessened mortality is confined almost exclusively to the population of American parentage.

Taken as a whole, the report represents much good work and careful study, and it is commended to all sanitarians, as well as statisticians, as one of which they should by all means endeavor to secure a copy.

CENSUS OF THE CITY OF PROVIDENCE, January 1, 1883. Taken under the direction of EDWIN M. SNOW, M.D. 28 pp., 8vo. Providence, 1883.

As shown by this Census the total population of Providence is 116,755, of which 55,736 are males and 61,019 females. Th·se occupied 14,804 dwelling houses, or 25,-977 · tenements, thus forming 25,977 families. The average number of tenements to each house is 1.78. The number of families to each dwelling has increased, while the average size of families has decreased; the general tendency being to increase the crowding of population. The average number of persons to each dwelling was found to be 7.77 as against 7.18 in 1878 and 7.58 in 1875. In the different wards of the city this number varies from 6.72 to 8.85.

The total number of children of school age (5 to 15 years) was 22,062, and of these 17,287 were attending school, which is a very favorable showing.

SIXTH ANNUAL REPORT OF THE BOARD OF HEALTH, OF THE STATE OF NEW JERSEY. 1882. 361 pp., 8vo.

One hundred pages of this volume are occupied with the report, of the Bureau of Vital Statistics, for the year ending July 1, 1882. From this we learn, that during the year, there were recorded 8,837 marriages, 23,108 births, and 25,942 deaths. This gives a death rate for the whole State of 22.9 per 1,000, and for cities of over 5,000 inhabitants of 26.71 per 1,000. This is a marked increase (over 5,000 deaths) over that of the preceding year, and about one half of this increase occurred in Essex and Hudson counties.

C. J. Rooney, Jr., the Registrar of the Hudson Co. Board, remarks that "the greater part of the increase of mortality took place among persons over five years old, and was due mainly to consumption, small-pox, pneumonia, croup, scarlet fever, diphtheria, typhoid and typho-malarial fevers, measles, bronchitis and meningitis."

The increase of 1,258 deaths in Essex County, depends chiefly on an increase of 1,028 in the city of Newark.

We do not find among the reports from the local boards of health, any report from the Boards of Hudson County, or of Newark, giving the reasons for this increase, nor does the State Board furnish any information on the subject.

It seems to us that such a marked localized increase in mortality calls or an investigation into its causes.

Very little information is given in the tables in the report on vital statistics, which are meagre in the extreme, and form a strong contrast to the elaborate tables given in registration reports of Massachusetts, Connecticut, Rhode Island and Michigan. We are told that extended tables are reserved for the next report, which will include the data for five years, but it seems to us that it would be better to give the data fully each year.

Turning now to the report of the Secretary of the Board, Dr. E. M. Hunt, we find that it is essentially a good popular lecture upon the importance of sanitary work, fortified with extensive quotations from Herbert Spencer, Bailey Denton, Galton and others. It takes up water supply, drainage, malaria, city sewers, disposal of sewage, offensive trades, State sanitary survey, local health boards, health of operatives, grave yards, diseases of animals, etc., but it does not furnish any information as to the condition of any of these matters in the State of New Jersey.

Now it seems to us that this is a mistake. It is of course much easier to sit down and write a paper on the importance of sewers than it is to investigate the system of sewerage of Newark or Trenton, and state the defects and needs. But the time has gone by when essays and quotations can take the place of actual investigation and practical concrete recommendations on the part of a salaried health official.

We say this with all deference to Dr. Hunt's experience as to the sanitary needs of his own State, and because we know that on the part of the educated public there is a growing impatience with vague abstract recommendations, to which it will be well for sanitary officials to give heed before it is too late.

The models for State Board of Health reports, are the reports of the Medical Office of the Privy Council and of Local Government Board, and of the Massachusetts State Board of Health before its consolidation, and these furnish facts, as well as opinions.

Following the Secretary's report come four papers on small-pox and vaccination by Dr. T. F. Wood, of Wilmington, N. C., Dr. E. M. Hunt, the Secretary of the Board, Dr. E. L. Griffin President of the Wisconsin State Board of Health, and Dr. E. J. Marsh, President of the Board of Health of Paterson, N. J.

These papers are mainly devoted to the discussion of the relative merits of bovine *vs.* humanized lymph, of utility of re-vaccinations, and of the means of determining the value of the lymph, and of the protection as related to the scar. They give a good *resumé* of what is known in the subject, and we commend them to all who are interested in the subject. Dr. Marsh's paper is short, but it gives the results of his own experience, and is therefore fresh and interesting. He thinks that both bovine and humanized virus should be retained in use.

A paper on Disposal of Sewage in Cities, by Col. Julius W. Adams, C.E., is a valuable contribution on the subject. His statements regarding the pail or tub system coincide with our own investigations. In discussing systems of sewerage there is an evident preference for the combined system, yet the whole subject is gone into in such a manner that we commend the paper to those who are interested in the subject.

Dr. Albert R. Leeds contributes an interesting paper on Infant Foods, in which he points out the unreliability of certain conclusions that have been widely quoted. We shall probably refer to this paper at another time.

Prof. Charles McMillan, C.E., Princeton, contributes a paper on the disposal of town sewage, which is a summary of English and French experience on this subject.

Dr. Hunt furnishes a short paper on the causation of typhoid fever by cesspools, taking as examples an outbreak at the Centenary Institute at Hackettstown where there were 30 cases and four deaths, an outbreak in a hotel on the seashore and one in the Hudson County almshouse, in all of which there was defective drainage.

A paper by Prof. Brackett, on the regulation of moisture in rooms, we shall notice more fully hereafter, from which we learn that 18 complaints against persons selling impure milk have been made, of which six have been fined fifty dollars each, five are still pending and seven have been discharged on payment of costs. He is strongly in favor of the New York law forbidding the sale of skimmed milk, and thinks that the food adulteration law is fully competent to cope with the adulteration of milk, and the inspector should be required or authorized to bring his complaints under that law, which seems to us quite correct.

Dr. E. M. Hunt has an interesting paper in local sanitary inspections of sea-side resorts, etc., giving the results of his examinations at Cape May, Atlantic City, etc., which we commend for perusal to all who visit these resorts. Though we are disposed to complain because we do not find in this report that information about sanitary matters in New Jersey which a State Board of Health report should contain, yet we can commend it as well calculated for family reading throughout the State.

THE NATION.

We have received the list of "Books Reviewed in the *Nation*," during the quarter ending March 31, 1883. Probably in no other American periodical is the same amount of special knowledge utilized for readers, as in the Book Columns of the *Nation*, from which these titles are taken.

BOOKS RECEIVED,

JOURNAL OF THE FRANKLIN INSTITUTE, May, 1883.

PUBLIC OFFICIAL CARE OF ORPHAN AND DESTITUTE CHILDREN *VERSUS* PRIVATE BENEVOLENCE. Letter regarding Assembly Bill 121.

MAP OF THE WOOD RIVER MINING REGION. *Wood River Times*, Hailey, Idaho.

REPORTS OF THE TRUSTEES OF THE SANITARY IMPROVEMENT BONDS, OF THE CITY OF JACKSONVILLE, FLA., to the City Council, July 1, 1881, July 1, 1882, and March 14, 1883, with Report of Engineer and Tables annexed.

ANSWERS TO INQUIRIES ABOUT THE U. S. BUREAU OF EDUCATION, its Work and History. Prepared under the direction of the Commissioner, by Charles Warren, M.D. Washington: Government Printing Office, 1883.

JOURNAL OF THE ASSOCIATION OF ENGINEERING SOCIETIES—BOSTON, ST. LOUIS, CHICAGO, CLEVELAND. February, 1883.

QUARTERLY REPORT OF THE CHIEF OF THE BUREAU OF STATISTICS, Treasury Department, relative to imports, exports, immigration and navigation of the United States, for three months ending Dec. 31, 1882.

We have received from Mr. C. S. Sargeant, THE REPORT OF THE BOARD OF HEALTH OF THE CITY OF NEWBURYPORT, MASS., for 1882.

STATISTICAL TABLES FROM THE HISTORY AND STATISTICS OF AMERICAN WATER WORKS. By J. J. R. Croes, M. Am. Soc. C.E., M. Inst. C.E. Compiled from Special Returns. Published by *Engineering News*, New York, 1883. Paper, pp. 113.

AN OPEN LETTER TO THE AMERICAN (COAL) GAS LIGHT JOURNAL, replying to the Editorial of March 16, 1883, "Carburetted Poison." A. O. Granger & Co., Philadelphia, 1883.

PLUMBING LAW VIOLATIONS.

Nine violations of the plumbing regulations were reported at the Health Department of this city, last week, by the following inspectors: Dickinson, three; Hollick, two; Hooper, Elliot, Hicinbotham and Golden, each one. None were of a very serious nature. No cases were referred to the attorney. No violations of light and ventition plans were reported.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

AUTOMATIC SHUT-OFF FOR GAS PUMPING ENGINES.

The following inquiry has suggested a description of an automatic arrangement for turning off the gas supply to a hot air pumping engine, recently arranged by Messrs. Pasco & Palmer, plumbers, of this city:

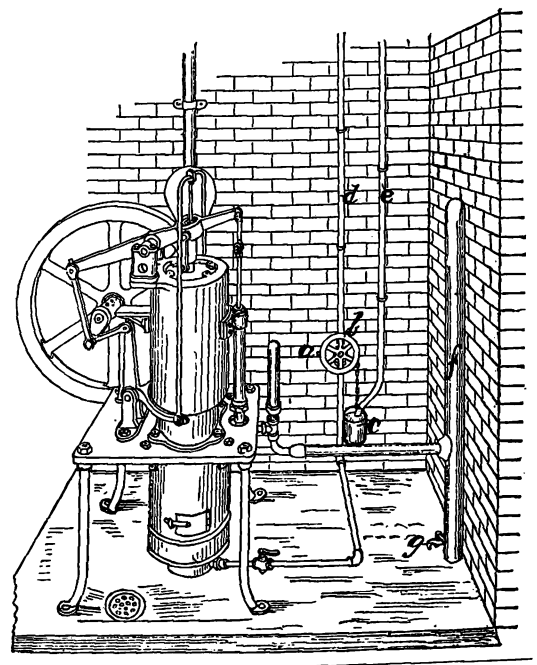
METROPOLITAN GAS LIGHT CO.,
BROADWAY, CORNER OF 46TH ST.,
NEW YORK, *April* 26, 1883.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR:—Can you let us know whether there is any device whereby the gas supply to the Caloric Pumping Engines can be shut down to a mere spark when the water tank is full, and turned on again when the tank is empty, automatically, and much oblige,

Yours respectfully,
O. F. ZOLLIKOFFER, *Sec'y.*

[The device represented in the drawing does not do



what our correspondent asks for, which would seem to be a much more difficult thing to accomplish than to

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simply turn off the gas, since the hot air pump in most common use is a single crank engine, requiring the proper adjustment of the piston before starting.

The following is an explanation of the arrangement shown in the sketch: On the gas pipe *d*, supplying the engine, is a stop cock, on which a grooved iron wheel takes the place of a handle. A chain, attached to a pin at the point *a* in the circumference of the wheel, passes over the top and supports a small tin pail, *c*. The end of the tank tell-tale *e* is brought over the pail, so that the weight of the water discharged into it will cause the pail to fall, thus turning the wheel and closing the valve on the gas pipe. Before starting the pump again the pail is emptied. The large pipe *f*, shown on the right hand, is an air chamber on the suction pipe to supplement the smaller one attached to the pump. The stop-cock *g*, at its foot, is for removing all the water from it.

There are other devices for the same purpose, such as a small tank under the tell-tale, containing a float connected with the valve on the gas pipe, but the arrangement shown above is simpler than anything we have seen for the purpose.]

Construction Notes.

The Roesch tile pipe bill, having before passed the New York Assembly, last week passed the Senate, and now goes to the Governor.

COHOES, N. Y.—The Water Company is to have made an examination and report by J. J. R. Croes, C. E., for a supply of water by gravity.

REVERE, MASS.—The Revere Water Company asks authority to contract with the town of Revere, Mass., to supply the town with water, for fire and other purposes.

MISSION BAY, CAL.—A bridge company, capital $50,000, has been incorporated to build a bridge over Mission Bay.

NEWTON, N. J.—The question of a water supply is being agitated. It is estimated that a sufficient quantity can be secured by an outlay of $40,000.

LYNN, MASS.—There has been one hearing before the legislative committee on Lynn's petition to take Saugus River and its tributaries as an additional water supply source. Members of the committee went to Lynn last week and looked over the territory about the water sources. Hon. B. W. Harris, representing the town of Saugus, accompanied the party and objected to the granting of the petition of Lynn, on the ground that the principal industry of the town of Saugus would be ruined thereby.

CHICAGO.—Commissioner Cregier, of the Board of Public Works, has accepted the proposition of the Pittsburgh, Fort Wayne & Chicago Railroad Company to give the land required to straighten the river between Adams and Van Buren streets, provided the city would build a dock there and dredge the river. The improvement will be made this spring, to the great satisfaction of the shipping interest.

WARREN, MASS.—The rebuilding of the bridge, for which there is appropriated $480,000, is to be done by day's work, not by contract.

WASHINGTON, D. C.—The contract for cut granite for backing and pier stones for the west wing and centre wings of the building for the State, War and Navy Departments has been awarded to the Ellsworth and East Blue Hill Granite Co., East Blue Hill, Me., at one dollar per cubic foot, net dimensions.

DETROIT.—The Water Commissioners have awarded a contract for iron pipe to the Cincinnati & Newport Iron Company for $42,000.

NEW ORLEANS.—The following contract for erecting the new Produce Exchange Building was awarded by the Building Committee, to be built after the plans of James Freret, architect: to Messrs. O'Neil & Garvey, basement granite, balance brick and Portland cement, $29,040.

MINNEAPOLIS, MINN.—The following bids for a pump, for City Water Works were received by J. W. Henion, Secretary of the Board of Water Commissioners, April 27:

Lockwood, Upton & Co.,	work and furnishing materials	....	$10,850 00
North Star Iron Works,	" "	....	10,682 94
Pray Mfg. Co.,	" "	....	12,470 42
Strothman Brothers,	" "	....	9,700 00

Contract awarded to Strothman Brothers, Minneapolis, Minn.

OHIO.—Recent incorporations: the Rote Automatic Brake Co., Mansfield, capital $5,000,000; Elyria Wrought Iron Fence Co., capital $40,000.

The contract for building an iron superstructure for a bridge over Duck Creek, Columbia Township, Ohio, was awarded by the Commissioners of Hamilton County, Ohio, to the Lomas Forge and Bridge Works for $795. The Queen City Bridge and Steam Forge Co. bid $928; with railing $880; M. Lewinsohn for entire work, $3,200. The contract for masonry, etc., was awarded to Ed. Sullivan for $1,447.30.

MONTREAL.—At a meeting of the Road Committee the contract for 8,000 tons of broken stone and 2,000 tons of screenings was awarded to Burgoin & Lamontagne, at $1.75 for stone, and $1.65 for screenings

CHICAGO.—Contracts for laying pipe sewers in the various districts of the city are awarded as follows: District 1, south side, for $3,593.10, to Nichols & King; districts 2 and 4, west side, for $5,986.00 and $3,805.65, respectively to the same; district 3, west side, for $4,275.87, to John Lyons; district 5, north side, for $4,442.05, to Thomas McQueeney. A sample price per foot (the figure varies for each street according to depth of cut, etc.) is Nichols & King's bid of $1.50 per lineal foot of twelve inch pipe in Thirty-second street, the "cut" being 11.2 feet.

Building operations continue much set back by the bricklayers' strike. An arbitration committee is at work, with fair prospects of a speedy settlement.

Contracts are let, at prices already reported, to H. A. Streeter, for iron roof on Pumping Works, and to Chicago Dredging & Dock Co., for dredging the Chicago River.

NEW YORK.—At the Hall of the Board of Education, May 7, the contract for alterations, etc., at Grammar School House No. 20, was awarded to Thomas Falvey for $7,176.

On May 14 the following bids were opened for the erection of a new school house on the southeast corner of Lexington avenue and 68th street: John P. Schweiklert, $122,890; George H. Christie, $118,484; James Duffy, $123,229; T. O'Hagen, $122,200; John Kelleher, $125,000; Mooney & Hatton, $118,800; David E. Herbert, $132,832; Terence Kiernan, $129,760; Edward Gustavus, $124,800.

ST. PAUL, MINN.—The Board of Public Works have awarded the contract for grading Oak street to J. J. Palmer, for $4,433.

ALBANY.—The new capitol architects report that its completion will require $4,740,944, of which $720,000 is needed for the tower, and $1,500,000 for the terrace. The sum now needed will bring the total cost to $18,953,937.

HOT SPRINGS, ARK.—The contract for bricking up and making a sewer of the creek which runs through this place has been awarded to Col. Bardwell, of Philadelphia, for $78,089.

PHILADELPHIA.—The sub-committee of Councils' Committee on Finance have decided to recommend the Finance Committee to report an ordinance to the chambers authorizing the loan of $500,000, to build the intercepting sewer from Manayunk to Fairmount dam.

NEW YORK.—The Electric Railway Company of the United States, with a capital of $2,000,000, has filed articles of incorporation with the Secretary of State. The directors are John P. Kennedy, Geo. S. Scott, Grosvenor P. Lowrey. Simeon G. Reed, Stephen D. Field, C. W. Rogers, Robert M. Gallaway, Robert E. Deyo, and S. B. Eaton. The company owns the patents of Thomas A. Edison and Stephen D. Field for electric railways in the United States. They also take title to Mr. Edison's railways from Menlo Park, three miles in the direction of Plainfield. Mr. Edison will be consulting electrician and Mr. Field will have special charge of the railway business.

A certificate of incorporation of the Eastern Overland Telephone and Telegraph Company was filed May 4, in New York. The the corporators are: John R. Bartlett, Samuel W. Hale, John B. Reynolds, Lucius V. Walkley and Benjamin Thompson. The capital stock of the company is fixed at $2,000,000, divided into 20,000 shares.

ALBANY.—The Niagara River Bridge Company and the Niagara Peninsular Bridge Company, have filed agreements to consolidate, under the name of the the Niagara River Bridge Company, with a capital of $100,000, for the purpose of constructing a railroad bridge over the Niagara River.

CINCINNATI.—The following companies have filed papers of incorporation: The American Union Electric Company, of Cincinnati; capital stock, $100,000. The Hocking Valley Fire-brick Company, of Lorain; capital stock, $25,000.

ST. LOUIS.—A company has been formed here for perfecting a system of electric railways. It is styled the "Adams Electric Company," and experts, who were formerly foremen for Edison and Brush, have been secured to perfect an invention which the company controls.

A dispatch from Albany states that on May 7 Thomas A. Edison and others, representing a capital of $2,000,000, filed papers with the Secretary of State incorporating the Electric Railway Company of the United States. The object is to develop electricity as a motor for the propulsion of railroad trains.

The International Coffer-Dam Company, capital $100,000, was incorporated at Albany last week.

The Directors of the Board of Trade, of Chicago, have contracted to have a building erected on ground located on Pacific avenue and Clark street, to cost $100,000.

NEW YORK.—The following bids were opened at the Department of Public Parks, on May 5: For constructing a sewer and appurtenances in 144th street, comprising a 12-inch pipe sewer, spurs for house connections, manholes, lumber and concrete, $1,990.70; the lowest bid was by B. C. Murray.

For a constructing a sewer and appurtenances in North Third Avenue and Boston Road:

Class of Work.	Quantities.	John McKim & Son. Amount.	James H. Sullivan and M. A. Kellogg. Amount.	Charles Jones. Amount.	Thomas H. Casey. Amount.
Brick sewer, 3' x 2' 2"	175	$1,575 00	$1,400 00	$1,750 00	$875 00
Brick sewer, 2' 6" x 2' 0"	862	5,603 00	5,603 00	7,137 50	3,448 00
18-inch pipe sewer	284	1,278 00	1,065 00	2,272 00	568 00
15-inch pipe sewer	306	1,224 00	1,071 00	2,371 50	918 00
12-inch pipe sewer	1,685	4,381 00	4,807 00	11,626 50	4,211 25
Spurs for house connections	277	332 40	554 00	692 50	692 50
Man-holes	[illegible]	590 00	970 00	1,000 00	800 00
Receiving basins	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rock	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Lumber	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Concrete	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

For regulating and grading Lincoln Avenue and setting curb-stones and flagging the sidewalks from the northern curb line of the Southern Boulevard, to the eastern curb line of North Third Avenue, comprising 2,600 lbs. of vitrified stone-ware sewer pipes furnished and laid: Charles Jones, $3,900.50; James H. Perkins, $3,[illegible]; Thomas Murray, $4,110.25, Wm. F. Croft, $4,[illegible]; Bernard Mahon, $4,179.50.

For regulating and grading Willis Avenue, and also setting curb-stones, paving gutters and flagging sidewalks therein, between the Southern Boulevard and North Third Avenue, comprising 2,500 lbs. of vitrified stone-ware pipe, etc., in place: Bernard Mahon, $[illegible]; James H. Sullivan and M. H. Kellogg, $21,435; Wm. F. Croft, $23,070; Charles Jones, $21,550.

For regulating and grading Courtland Avenue, and also setting curb and flagging therein, from North Third Avenue to East 156th Street, comprising 2,500 lbs. of vitrified stone-ware pipes etc., in place: Bernard Mahon, $5,769; William F. Croft, $5,796; Thomas Murray, $4,685; B. C. Murray, $5 769.

For laying a crosswalk across the roadway of Washington Avenue at each of the intersections of East 169th Street, to East 169th, and at 172d, 173d and 175th Streets, and across the roadway of each of the above mentioned streets at its intersection with Washington Avenue: Dennis W. Moran, $1,473.80.

For constructing a sewer and appurtenances in 138th Street, between Willis and Brook Avenues, with a branch in Brown Place, between 138th and 137th Streets, comprising 1,270 lin. feet 12-inch pipe sewer, spurs for house connections, receiving basin, man-holes, rock, lumber, concrete Bernard Mahon, $9,762; John McKim and Charles McKim, $13,853.40; Wm. F. Croft, $7,784.50; Thomas H. Casey, $10,458.50; Joseph D. Nutt and P. Kearns, $10,544,31; Charles Jones, $9,784.71.

The following contracts were awarded at the Department of Public Works on May 8: for constructing a sewer in Ninth Avenue, west side, between 86th and 92d Streets, to Nutt & Kearns at $12,021.56; Sewer in Washington Street, between Vestry and Desbrosses Streets, to Nutt & Kearns, $1,108; Sewer in West Tenth Street, between Greenwich and Sixth Avenue, to T. A. Devlin, $1,165; Sewer in 104th Street, between Eighth and Ninth Avenues, Vincent Clark, $11,143.01; Regulating and grading 156th Street, from St. Nicholas Avenue to 11th Avenue, James Slattery, $6,149.80; Paving 43d Street, from Second to Third Avenues, with granite block pavement, Thomas Gearty, $7,389.36; Paving 111th Street, from First Avenue, to Avenue A, with granite block pavement, George F. Doak, $4,995.20; Paving 123d Street, from from 2d to 3d Avenues, with granite block pavement, George F. Doak, $4,508; Paving 111th Street, from Fourth to Madison Avenues, Thomas Gearty, $2,382.33; Laying water mains in 149th, 145th, 163d, 160th, 106th and Home Streets, and in Robbins, Sedgwick, Railroad, Forrest, Lexington and Madison Avenues, Alexander Forsyth, $15,261; Furnishing, delivering and laying six and 4-inch pipe to supply water to the hospitals on North Brother's Island, John McKim, $29,180.

The Lewisburg, Pa., Water Company has determined to erect a stand pipe instead of a reservoir to supply that town with water.

CHICAGO.—Bids have been opened by the Department of Public Works to pave 25 streets, J. B. Smith & Co. being the lowest bidders for the contract for cedar blocks, and John E. McMahon for most of those of Medina stone.

QUEBEC.—The Quebec City Counsel adopted the report containing the conditions to contractors tendering for the new water main from Lorette.

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Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

Gold st, Nos. 92 and 94, and 11, 13, 15, 17 Jacob st, br store; cost abt $75,000; o, Ambrose K. Ely; a, Jno. McIntyre; m, not selected; c, W. J. O'Connor....108, 110, 112 Greene st, two iron warehouses with exten; cost $52,500; o, Louise B. Stilwell, extrx. G. Boyce estate; a, Henry Fernbach; b, Van Dolsen & Arnott....269 Henry st, iron stone and br dwel; cost $18,200; engine Co. No. 15; o, City New York; a, N. Le Brun & Son....742 E 5th st, iron st and br Hook and Ladder Co. No. 11 dwel; cost $17,000; o, City New York; a, N. Le Brun & Son....533-535 15th st, E, two br ten; cost $9,000 and $11,000; o, James Mulry; a, Fred Jenth .. 334 26th st, W, br store and flats; cost $18,000; o, Thomas H. Matthews; a, D. & J. Jardine....140 36th st, W, b st ten; cost $22,000; o, Samuel McMillen; a, J. E. Ware.... 4ad st, s s, 32.6 w 3d av, br store; lessee Patrick Maher; a, A. Arctander....114th st, n s, 325 w 1st av, br ten; cost $15,000; o, James Riley, a, John McIntyre; b, not selected... 124th st, n s, 100 e 3d av, brick apart h; cost $65,000; o, Daniel T. McFarlan; a, R. Rosenstock; b, J. Fettretch... 146, 146½, 148, 148½, 150, 150½ E 125th st, s s, 67 e Lexington av, six br stores; cost ea $1,500; lessee Wm. A. Martin.... 73d st, n s, 135 e 3d av, 14 b s ten; cost ea $15,000; o, Abraham H. Jonas; a, John C. Burne; b, not selected....82d st, s s, 156.6 e 1st av, br ten; cost $17,000; o, Annie E. Kelly; a, G. A. Schellenger....Railroad av, e s, 300 s 175th st, Tremont, two fr dwel; cost ea $2,500; o, Sarah J. Wyckoff; a, Theo. E. Thomson ...Washington av, s w cor 170th st, seven br dwel; cost ea $6,000; o, Frederick Folz; a, T. E. Thomson.

ALTERATIONS, NEW YORK CITY.

3, 5, 7, 9 3d st, W, raise attic to full story, new flat roofs and exten; cost $20,000; o, Edward P. Dickie; a and c, Chas. E. Hadden; m, Kelly & Murdock....66, 68, 70, 72 Elm st, br exten; cost $10,000; o, City of New York; a, D. J. Stagg....466 8th av, br exten; cost ——; o, Lucy A. Ledwith; a, J. M. Dunn; b, John W. Ross and John F. Moore....49 36th st, W, raise one story; cost $3,500; o, Dr. Robert Watts; a, H. M. Congdon ...413 57th st, W, br exten; cost $6,500; o and b, David Christie....58 24th st, W, br exten and rebuild walls; cost ——; o, Adam Rust; a, J. E. Terhune....411 84th st, E, brick exten; cost $3,000; o, H. Zubiller; a, Wm. Graul....236-238 33d st, E, connect two build and a br exten, cost ——; o, Andrew C. Zabriskie; b, M. Reid and Steele & Costigan....234 38th st, W, raise front of building one story; cost $5,000; o, Barbara Seitz; a, Joseph M. Dunn....26 37th st, E, internal alter; cost $18,000; o, Chas. Lanier; a, Carl Pfeiffer; b, Geo. Mulligan....65 and 67 Suffolk st, raise one story; cost $2,500; owner Henry B. Schoppen....Park pl, s w cor Church st, fireproof vaults; cost $10,000; o. Metropolitan Life Ins. Co.; a, N. Le Brun & Son; b, J. C. Lyons and Smith & Bell....147 Baxter st, repair damage by fire; cost $3,000; o, Henry M. Johnson ....413-415 25th st, repair damage by fire; cost $3,000; o and a, Chas. Wagner; b, C. W. Klappert's Sons.

BROOKLYN.

Linden st, n s, 100 w St. Nicholas av, fr church; cost $8,000; o, John NcCloskey; a, T. F. Houghton....Rutledge st, n s, 222.6 e Marcy av, two b st dwel; cost $14,000; o, John K. Sunderland; a, J. Rose ...Scholes st, s w cor Ewen st, fr ten; cost $7,500; o, Jacob Stadtmueller; a, J. Platte; b, J. Rauth and D. Kreuder....Johnson av, s w cor Leonard st, br ten; cost $10,000; o, Joseph Simon; a, J. Platte; b, J. Rauth and D. Kreuder....Baltic st, s s, 275 e Smith st, six, b flats; cost ea $10,000; o, James W. Dearing; a, Parfitt Bros.; b, G. B. Dearing ...Flushing av, s s, 25 w Hamburg av, two fr ten; cost ea $3,000; o and b, George Loeffler; a, Th. Engelhardt....Vernon av, n s, 125 w Sumner av, five br dwel; cost ea abt $4,000; o, John Longhi; b, S. C. Phillips....Union st, n s, 253 w 7th av, two br st ten; cost ea $6,000; o, G. W. Brown; b, L. E. Brown... President st, s s, 282.2 e Smith st, four br st dwel; cost $24,000; o and b, Chester Bedell; a and c, Theo. Pearson; m, Walton Smith....13 st, n s 100 e 5th av, five br dwel; cost ea $2,500; o, Daniel Doody; a, C. B. Sheldon....8th av, n e cor President st four br st dwel; cost each $20,000; o and b, Wm. Gubbins; a, Chas. Werner....Jefferson st, s s, 150 e Marcy av, three br dwel; cost ea $7,500; o, a and b, Geo. H. Stone.... North 11th st, foot of st, abt 310 w 1st st, br shed; cost $13,000; o, Pratt Mfg Co.; a, F. Le R. Sweet; b, J. Rooney and Jenkins & Gillies....Broadway, s w cor Park av. br store, photo gallery; cost $12,000; o, Otto Wagner; a, Engelhardt; b, Geo. Lehrian & Son.... Magnolia st, s e s, 33.11 s w Myrtle av, fr store and dwel; cost $5,000; o, Mrs. Gillespie; a, Duckworth & Co.; b, Jno. Fallon....Marcy av, e s, 20 s Monroe st, eight br st dwel; cost ea abt $6,000; o, a and c, F. C. Vrooman; m, John Softy.

ALTERATIONS, BROOKLYN.

Broadway, s w cor 1st st, br exten on s s of bank; cost $12,000; o, First National Bank; b, W. & T. Lamb and Jenkins & Gillies...Bedford av, n e cor Ross st, br exten; cost $3,500; o, Thomas S. Cooper; a, E. F. Gaylor; b, Thos. Gibbons and Jenkins & Gillies.

BOSTON.—105 & 107 W 7th st, fr dwel and store; o, Sarah O. Malley; b, Isaac S. N. Dunn....Dorchester av nr Greenwich st, dwel; o, Patrick and Michael Finnegan; b, Michael Ryan....Mayfair st, nr Brambridge st, dwel o, Thomas J. Thomas; b, C. Blodgetts . 260 Eagle st, dwel; o, Joseph W. Simpson; b, James Emsoe .. Dorchester av cor Alger st, dwel & store; o, Alfred L. Armstrong ...82 Rutherford av, dwel; o, John Donovan; b, Ed. J. Tully.... Tremont st, nr Whitney pl, dwel; o, Patrick Daley; b, Joseph Donnelly....40 Blue Hill av, dwel; o, and b, Leander B. Abbott ....40 & 42 Blue Hill av, two dwel; o, and b, Leander B. Abbott ...387 and 389 Summit st, two dwel; o, Eliza Moore; b, Hoerman Drake....81 and 89 Washington st, br mechanical; o, Hapgood Sargent, trustee....93 & 99 Beverly st, br stores; o, J. C. & E. S. Convers....180 Commonwealth av, br dwel; o, and b, Wm. S. Rand.

CHICAGO, ILL.—College pl and Rhodes av, br flats; cost $75,000; o, Frederick Crumbaugh; a, Wheelock & Clay; b, Wm. Zeuldorf & Rob't Porter....900 S Ashland av, br dwel; cost $9,000; o, J. S. Hoerber; a, D. W. Ruehl; b, Benes & Layer....436 S Jefferson st, br flats; cost $5,400; o, A. Silhauck; a, Wm. Drak; b, Julius Lula. ..572 Centre av, br dwel, cost $6,000; o, V. Kirdera; a, Wm. Drak; b, Julius Lula....Pearson nr Pine st, br stable; cost $5,000; o, C. B. Farwell; a, Jas. M. Van Osdell; b, Ald. Phelps....194-196 S Ashland av, st and br; cost $12,000; o, H. H. Aldrich; a, Cobb & Frost; b, not let....136 Taylor st, br dwel; cost $6,000; o, M. Doorak; a, P. W. Ruehl; b, Benes & Layer....539 W 18th st, br dwel; cost $5,200; o, Frank Conrad....116-124 Lincoln av, br barn; $6,000; o, C. J. Singer....596 La Salle av, br dwel; cost $9,000; o, Eliz. Klaner....Flournay nr Hoyne st, br flats; cost $7,000; o, H. C. Langlor; a, owner; b, owner....46-48 S Carpenter st, br flats; cost $15,000; o, P. H. Rice; a, C. M. Palmer; b, DeLaney & DeLaby....392 Webster st, br flats; cost $5,000; o, J. Roeder; a, A. F. Boss; b, P. Ebertshauser ...380-386 Ontario st, br dwel; cost $13,000; o, W. B. Ogden Estate; a, Burling & Whitehouse....3830 State st, br dwel; cost $5,700; o, F. Hardt; a, W. Blank; b, Jno. Scheel ...2719-2723 State st, br stores and dwel; cost $24,000; o, Reynolds & Day; a, Van Osdell & Co.; b, not let....416-418 Jackson st, br dwell; cost $9,000; o, G. W. Stanford; a, A. Peabody; b, not let....2629-2634 State st, br stores and flats; cost $15,000; o, U. Long; a, C. M. Palmer; b, C. H. Blair....56 Bellevue av, br dwel; cost $7,000; o, S. S. Greeley; a, H. M. Hansen; b, Geo. Kabell....524 Hubbard st, br dwel; cost $8,500; o, Chas. F. Loerster. ..416 Halsted st, br store and dwel; cost $6,500; o, C. Lasman; a, Wm. Drak; b, J. Lula.... 418-420 Halsted st, br store and dwel; cost $13,000; o, L. C. Kuhnert; a, P. W. Ruehl; b, Benes & Layer....323-329 Loomis st, br dwel; cost $8,000; o, H. B. Sortman; a, Wm. Drak; b, Geo. Lehman & Co Leavitt and Lexington sts, br schoolhouse; cost $80,000; o, Chicago Board of Education; a, James R. Willett; b, Geo. Lehman & Sons....Webster av nr North av, br dwel; cost $5,000; o, Geo. U. Latrop; a, B. W. S. Clark; b, Wm. Johnson ....Mohawk nr Garfield av, br dwel; cost $5,000; o, Jno. W. Kent; a, L. G. Halberg; b, not let....Chicago av by Moody's church; br photograph gallery; cost $8,500; o, W. L. Felt; a, L. G. Halberg; b, not let....E Indiana av nr Rush, br apartment house; $7,500; o, Mrs. J. Hampson; a, L. G. Halberg....S Ashland av and Hastings, br church, st trimmed; cost $12,000; o, Reunion Presbyterian Church....La Salle av cor Elm st, st and br church; cost abt $20,000; o, Holy Trinity English Lutheran Church.

CINCINNATI.—Oregon nr Incline st, fr; cost $1,400; o, and b, Jn. Dolan ....917 Vine st, br; cost $10,000; o, Mrs. F. Darasmonk; b, Jos. Ausdeamoore ...588 Eastern av, fr; cost $7,000; o, A. S. Reidy; b, J. Mack... 27 6th st, nr main, fr; cost $14,000; b, and o, H. Weston....5th st nr John, fr; cost $12,000; o, J. P. Thorne; b, G.F. Neiber....Central av nr Baymiller, fr; cost $13,000; o, John Kahley; b, H. Kister....Cor 7th & Sycamore st, fr; cost $12,000; o, Blacker, Sachs & Grestle.

CLINTON, IOWA.—Br dwel, cost $20,000; o, S. B. Gardner; a, Edbrooke & Burnbam; b, by the day.

CLINTON, MASS.—Br block, cost $16,000, o, F. M. Crossman; a, Fuller & Delano; b, H. W. Welch.

DENVER, COL.—Lincoln av, br dwel; cost $8,000; o, M. Benedict; a J. H. Littlefield; b, J. A. McDonald....Arapahoe and 16th sts, br store; cost $30,000; o, B. F. Woodward; a, R. Roeschlaub; b, not let....Welton st, br dwel; cost $8,000; o, H. Taussig; a, Varian & Sterner; b, not let . Welton and 14th st, br dwel; cost $7,000; o, L. Sprague; a, J. H. Littlefield; b, not let.

DETROIT, MICH.—96-100 West Congress st, br warehouse; cost $23,000 a, A. C. Varney....214 West Congress st, br wire wk's; cost $14,000; a, A. C. Varney....71 East Mont calm st, br dwel & barn; cost $8,000; a, same....17 Peterboro st, br dwel; a, same as last. Cass av, br dwel; cost $10,000; a, same as last. ..21 & 23 Bagg st, 2 br dwel; cost $17,000; a, same as last....Cass av, fr dwel; cost $5,000; a, same as last....505 Cass av, br dwel; cost $7,000; a, same as last....783 Michigan av, 2 br stores; cost $6,000; b, J. A. De Gan .. 555 Second st, br dwel; cost $6,800; a, Julius Hess.... 557 Second st, br dwel; cost $12,000; a, same as last....Grand River av, add to br brewery; cost $6,000; a, same as last.. First st, br factory; cost $7,000; a, Mason & Rice....1008 Woodward av, br dwel; cost $12,000; a, Mason & Rice....838 & 840 Cass ave, 2 fr dwel; $6,000; b, W. H. & C. F. Gibson ...8 Howard st, br dwel; cost $5,000; b, Robert Robinson....56 Croghan st, br storehouse; cost $12,000; b, Albert Albrecht....Atwater st br warehouse; cost $5,000; b, Nappenan & Clark....421 Clinton st; br st & dwel; c, $8,600; a, Donaldson & Meier..363 St. Aubine av; br dw; cost $9,000; b, W. G. Vinton & Co.. ..34 Peterboro st br dwel; cost $10,000; b, A. Chapoton, Jr.....305-311 Woodward av, br store; cost $24,000; a, A. C. Varney....39, 41 & 43 Madison av, 3 br dwel; cost $13,000; a, A. C. Varney....96 Joy st br dwel; c, $5,000; b. G. A. Vinton & Co.....Campan av, add to br church; cost $4,900; a, Julius Hess.

EVANSTON, ILL.—Fr house, cost $2,000; o, Edwin Hinchcliff; a, Edbrooke & Burnbam; b, not let.

EVANSTON, WYOMING T'Y.—Fr church; cost $5,000; o, St. Mark's Episcopal Parish; a, Treat & Foltz.

GARDNER, MASS.—Fr dwel, cost $25,000 o, Geo. Haywood; a, Fuller & Delano....Fr dwell, cost $10,000; o, Seth Haywood; a, Fuller & Delano.

GENEVA LAKE, WIS.—Fr summer villa, cost $85,500; o, Jas. Walsh, Pres. W. Ind. R. R.; a, C. P. Thomas; b, Jno. W. Garvey.

GRAND CROSSINGS, COOK CO., ILL., fr house; cost $5,000; o, G. T. Dunne; a, B. W. S. Clarke, b, James Arrayo.

KANSAS CITY, MO.—Washington st and Alden pl, br dwel; cost $12,000; o, J. F. Corle....Indiana av nr Lydia av, br dwel; cost $5,000; o, A. F. Mayer....Dundee pl lots 13 & 14; br dwel; cost $5,500; o, W. T. Johnson....n w cor Grand av and 14th st, store; cost $25,000; o, Joseph Lorie; a, A. B. Cross.

KANSAS CITY, MO.—May cor 6th st, br str; cost $7,000; o, S.A. Pierce; a, J. E. Fleming ...Cor 9th st and Broadway, br dwel; cost $20,000; o, S. T. Willard....10th st, bet Washington and Broadway, stable; cost $25,000; o, C. F. Morse....Broadway and 11th st, five dwels; cost $30,000; o, C. A. Brockett; a, C. H. Mansfield.

LAKE VIEW, COOK CO., ILL., fr villa; cost $10,000; o, Joshua Smith; a L. G. Halberg.

LAKE VIEW, ILL.—Br dwel; cost $8,000; o, Mr. Lehmann; a, Treat & Foltz; b, not let.

LA PORTE, IND.—Fr dwell, cost $6,000; o. R. Davidson; a, Edbrooke & Burnham; b, not let.

MILWAUKEE, WIS.—Corner 10th and Clybourne sts, fr build; cost, $25,000; o, Abel, Bach & Fitzgerald; c, J. A. McCann & Co.... Clark st, 13th ward, fr dwell; cost, $8,000; o, A. Wolfenden.... Grand ave, w of 8th street, br dwel; cost, $12,000; o, E. W. Meacham....Milwaukee st, near Michigan, br store; cost, $16,000; o, Mrs. J. Follansbee; c, Dunn Bros. (The hotel building in March number is withdrawn, and the above store built instead.) ....Knapp st, fr dwel; cost, $5,000; o, Nic Engel; c, Anton Mauk....Cor National ave and Clinton st, br store; cost, $5,200; o, H. Westphal....59 West Water st, br build; cost, $5,500; o, Peter Van Beek; c, M. Sullivan....Cor Park st and 7th ave, addition to planing mill; cost, $5,000; o, Schmidt and Peterson ... Nos. 206 and 208 W. Water st, repairs on building; cost, $8,200; o, F. W. Hartman & Co....Grand ave, bet 5th and 6th sts, br store; cost, $15,000; o, M. Carpenter; c, Dunn Bros....3d st near Fowler, br soap factory; cost; $7,500; o, Alexander Mitchell; c, John Roberts and Chas. Dingwall ...cor 6th and Harmon sts, fr dwel; cost, $5,000; o, Christopher Gumb; c, Gottlieb Schlenstedt. ....No. 73 Prospect ave, br dwel; cost, $15,000; o, Sam'l C handler; c, Thomas Mason; a, Treat & Foltz, of Chicago....Oneida, East Water and River sts, lowering Opera House to first floor; cost, $35,000; o, H. Nunnemacher; c, H. Buestrin....530 Astor st bet Biddle and Martin; br dwel; cost, $17,000; o, Rev. J. N. Freeman; c, Clarke & Fuller, of New York and Chicago; a, Burnham & Root, of Chicago....Milwaukee st, near Huron, br barn; cost, $7,200; o, U. S. Express Co; c, George Gruendler....597 and 599 Third st, br store, cost, $5,000; o, George Geiger; c, C. Scheutnecht....12th st, br dwel; cost, $6,500; o, J. Scheller; c, J. Kratz & Son... Marshal st, bet Ogden and Knapp st, br dwel; cost, $5,000; o, C. Kramer; a, C. A. Gombert. .3d st, south of Clybourne st, br build; cost, $9,000; o, Mrs. W. H. Wright; c, Wm. Klocken; a, Henry C. Koch & Co.

MONROE, WIS.—Br school h; cost $16,000; o, the city; a, G. P. Randall.

NASHVILLE, TENN.—South Summit st, br school build; cost $12,500; o, Board of Education; a, W. S. Mathews; b, Jno. F. Bowers & Bro....South Spruce st, br dwel; cost $60,000; o, H. B. Grubbs; a, H. O. Thompson .. Broad st, br dwel; cost $80,000; o, J. L. Kennedy; a, W. H. Cusack....Church st, add and alter to dwel; cost $12,000; o, E. W. Cole; a, Wm. C. Smith....Gowdy and Demombreun st, br dwel; cost $5,500; o, Theo. Plumber; a, W. S. Mathews....Mulberry and C. R. R., flouring mill; cost $5,000; o, E. T. Noel....Lindsley av, br dwel; cost $5,500; o, J. W. Thomas; b, D. S. Wright... 90 South Market st, br storehouse; cost $12,000; o, Wm. Litteres; a, Wm. C. Smith; b, Simmons & Phillips.

NORMALVILLE, COOK CO., ILL.—Fr chapel; cost $5,000; o, St. Stephen's Episcopal mission; a, Treat & Foltz.

PETERSBURG, ILL.—Br public school h; cost $16,000; o, the town, a, G. P. Randall.

PHILADELPHIA, PA.—Allegheny avenue, near Fisher, dwel; builder, Sabastian Hum....S e cor 23d and Virginia, dwel; owner, F. W. Tweed....1542 Frankford road, dwelling and store; builder, Thos. E. Day....Esher, nr Thompson, six dwellings; b, Joseph Stutton....9th, nr York, two dwels; o, John Kleber.... Ripka and Washington, dwell; b, Sturges & Heath....Green Lane, bet Spring and Magnet, dwel; b, same as last....Jefferson, nr Linden, two dwels; b, same as last....N e cor Linden and Jefferson, dwel; b, Ed. Dleman .. 25th nr Oxford, three dwels; o, J. D. Crane .. Bodine, bet Sommerset and Kensington, dewl; o, John Cunningham....Kumball, nr 21st, six dwels; o, Robert Kaighn....Hanley, nr Wharton, dwel; b, E. Cubberly .. 5th, nr Lehigh av, two dwel; o, D. H. Gill....Pacific, nr Susquehanna, dwel ...3720 and 3722 Spring Garden, two dwel; b, E. J. Lynch ....Federal, nr 19th, 16 dwels; o, H. R. Conloreb. ..Hancock, nr Norris, four dwels; o, Chas. Horn....Ingersol, nr 23d, eight dwels; o, M. McMamis....Woodstock, nr Dramond, 14 dwels; o, Jas. Patterson....Cedar, bet Ember and Aaron, two dwels; o, Geo. Spave.....N w cor 23d and Baring, dwel; b, F. Vodges.... Hancock, nr Dauphin, three dwels; b, W. F. Shaw....Main, nr Seymour, four dwels; b, W. Mackey... Clover, nr 12th, factory; o, Yardell & Cooper ...Philip, nr Dauphin, three dwels; b, Jas. McArdle....2d, nr Dauphin, dwel; b, same as last... Leiper, nr Allen, dwel; b, Wendel & Smith ...Orthodox, nr Leiper, two dwels; b, same as last....Buckland, nr 67th, two dwels; o, M. Dehaven....Peach and Media, dwel; b; J. Garber....N e cor 15th and Columbia av, 14 dwels; o, Jos. S. Albright....Frankford road, nr Erie, two dwels; b, Barnes & Haman....Prospect, nr Ridge, dwel, o, Ernest Rangnow....1130 and 1132 Nevada, dwel; o, John Kleber....Jessup, nr Huntington, 22 dwel; b, Jas D. Thornton....Passyunk av, nr Tasker; seven dwel; o, James Evans.

PLATTVILLE, WIS.—Br public school; cost $25,000; o, the town; a, G. P. Randall.

READING, PENN.—Fourth & Washington st, st dwel; cost $12,000; o T. A. Wilson....Washington & Thorn st, br dwel; cost $6,500; o, T. A. Wilson; a, Wm. A. Fink....Poplar and Walnut st, 7 br dwel; cost $15,000: o, Schiller B. association; a, Wm. A. Fink....6th & Spruce st, 4 br dwel; cost $10,000; o, Wm. Penn....8th nr Penn st, br dwel; cost $5,000; o, Louis Dauth; a, Wm. A. Fink....br church; cost $8,000; o, Evangelical Cong; a, Wm. A. Fink .. Elm & 5th st, br house; cost $8,000; o, L. Repplier; a, E. Mull; b, J. Graeff....Kissinger st, br house; cost $8,000; o, John Barbey; a. E. Mull....Chestnut st, br cottage; cost $10,000; o, James Raber; a, E. Mull.

SAC CITY, IOWA.—Pressed br opera house, cost $25,000; o. Stock Co; a, Edbrooke & Burnbam; b, being figured.

SALT LAKE CITY.—Main st, br build; cost $10,000; o, a and b, Nicholas Groesbeck... South Temple, fr dwel; cost $5,500; o, W. E. Smedley; a, Jno. H. Burton; Geo. T. Rhodes.

SALT LAKE CITY.—South 2d bet Main & West st, br block; cost $7,000 o, G. Ryaran; b, Hayward & Co.

SALT LAKE CITY.—1st North st, 2 story br dwel; cost $6,000; o, F. J. P. Pasco; b, G. Atkins.

SANTA BARBARA, CAL.—Fr country villa, cost $22,000, o, Senor Hurlbert; a, C. P. Thomas.

SIOUX CITY, IOWA.—101 and 103 Jennings st, dwelling, cost $6,500; o, J. H. Swan; a, Correy and Laft; b, H. Ash....109-113 Market st, addition to sohool building; cost $2,800; o. Indian School District; a, Baldwin & Brown.

SIOUX CITY, IOWA.—Br school h; cost 10,000; o, the town; a, G. P. Randall.

SPRINGFIELD.—Indian Orchard st, Foundry, cost $30,000; o, Chapman Valve Co.; a, Charles Sidney; b, W. C. McCelallan.

TOPEKA, KANSAS.—General offices, br and iron; cost $130,000; o, Atchison, Topeka & Santa Fe R. R. Co., Burnham & Root; b, not let.

TOWN OF LAKE, COOK CO., ILL.—Store and br dwel; cost $35,000 o, James Walsh; a, C. P. Thomas; b, John W. Garvey.

WASHINGTON.—19 bet, M and N sts, 2 story br, cost $5,500; o, David King; b, R. I. Henning... cor 13 and L st, 2 story br, cost $5,000; o, C. R. Clifton....Vt. ave, bet N and O sts, br, cost $10,000; o, T. P. Simpson a and b, Glen Brown ...11 and Va. ave, s w, 3 story br, cost $5,000; o, A. S. Ford; a and b, A. F. Barker....R'bet 13 and 14 sts, 3 story br, cost $5,000; o, B. Robinson; a and b, Wm. P. Lipscomb....N. Y. ave bet 14 and 15 sts, 4 story br, cost $8,000; o, a and b, John T. Lenman....Va. ave, 10th s w. 3 story br, cost $6,000; owner Peter Latimer; architect and builder John Myers....N Caro, avenue, bet 6th and 7th sts, 3 story br, cost $5,000; owner T. G. Kimball, architect and builder Holtzclaw & Hepburn....cor 7 and D. st, s e. 3 2 story br, cost $6,000; o, Aulick Palmer; a and b, W. Garrison....N. Y. ave, and 14 st, 4 story br, $8,000; o, Chas. Edmonston....Vt. ave, bet L and M, 4 story br, cost $17,000; R. Poster; a, C. A, Didden; b, A. Lyles.

WHEELING, W.VA.—24th st, fr story and residence; cost $4,500; o, Wm. Wolvington; a, Grise; b, contract....Church foundation stone; cost $3,000; o, Presbyterian Church; a, S. M. Howard; b, G. Arckle ...12th st, alterations store; cost $2,000; o, Zanes estate; b, O'Brien .Huron st, fr dwel; cost $3,500; o, C. Wincher; b, Klieves Krapt & Co . .Market Square, br store and dwel; cost $8,000; o, McCarrell; b, T. O'Brien....Main st, store and dwel; cost $6,500; o, L. Pracht; a, Hamilton, b, Klieves, Krapt & Co. ....Water st, fr refrigerator; cost $2,000; o, Beef Packing Co., b, Company.

BOSTON.—N. W. Rice will erect a mercantile building of brick and granite, at the corner of Sand street and Linwood Place, cost $70,000. The award for the three best models of a statue for Paul Revere has been made to James E. Kelly, New York; Daniel C. French, Concord, Mass., and C. E. Dallin, Boston.

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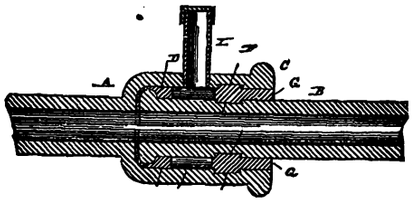
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

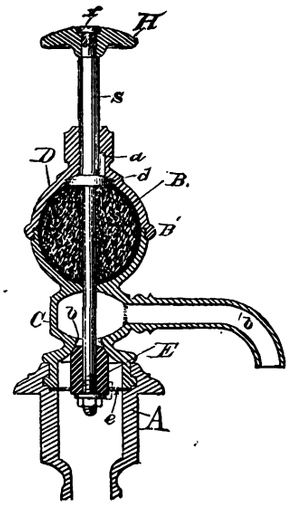
269,334. PIPE JOINT. ROLAND H. SMITH, PITTSBURGH. Pa. Filed June 14, 1882. (No model.) Issued Dec. 19, 1882.



Claim.—1. In combination with the pipe sections, provided with under cut recesses, the metallic packing cast, contracted, and tamped therein, substantially as specified.

2. The combination, with the two sections of a gas or water main, constructed, as described, of the metallic gaskets or packings, leaving an interposed space, and the pipe section leading therefrom, substantially as and for the purposes specified.

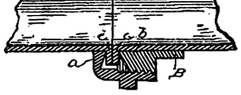
269,531. FAUCET. JAMES MCGINLEY, Chicago, Ill. Filed Feb. 18, 1882. (No model.) Issued Dec. 26. 1882.



Claim.—1. A faucet provided with a rubber sponge-ball vulcanized on the outside and inside, substantially as and for the purpose specified.

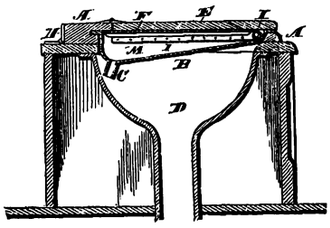
2. In a faucet, the combination, with the detachable parts C, D, forming chamber B', said part D having a slot *a'*, of the perforated ball B, inclosed in said chamber, and the spindle S, having valve E, collar *d*, and lug *a*, all substantially as and for the purpose described.

269,507. PIPE-COUPLING. CHARLES H. POPE, Thomaston, Me. Filed March 22, 1882. (No model.) Issued Dec. 26, 1882.



Claim.—The combination, with the pipe ends having upset flanges *c c*, of the connected clamping-pieces A B, having the inclined or beveled edges *a b*, substantially as described.

269,648. DEVICE FOR WASHING A COMBINED URINAL AND PRIVY-COVER. SIGMUND EDINGER, New York, N. Y. Filed Sept. 22, 1882. (No model.) Issued Dec. 26, 1882.



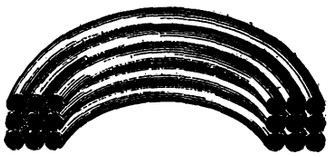
Claim.—1. The combination, with a combined urinal and privy-cover, consisting of a pan and an auxiliary cover, of devices to introduce water therein to for the purpose of washing the same, substantially as set forth.

2. The combination, with a combined urinal and privy-cover consisting of a pan and an auxiliary cover, of devices to spray water into said pan and onto the inner face of its auxiliary cover, substantially as set forth.

3. The combination, with a combined urinal and privy-cover, the same being attached to the seat of a closet, of a water-pipe and a pipe movably connected with the pipe aforesaid, and extending into the urinal and privy-cover, the portions of the pipe located therein being perforated.

4. The combination, with a combined urinal and privy-cover, the same being attached to the seat of a closet, of a closet water-pipe extending above said closet-seat, the end of the pipe being provided with a perforation, and a pipe secured to and extending into the urinal and privy-cover, the outer end of a pipe being movably connected with the pipe aforesaid, and provided with a perforation to register with the perforation thereof.

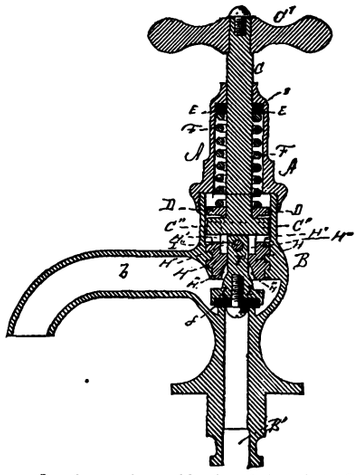
269,651. MANUFACTURE OF LEAD PIPE. JOHN FARRELL, Pittsburg, Pa. Filed Aug. 26, 1882. (No model.) Issued Dec. 26, 1882.



Claim.—1. A coil of lead pipe, such pipe being of oval, flattened, or elliptical form in cross-section and wound or coiled in the plane of its greatest diameter, substantially as set forth.

2. The improvement herein described in the art of preparing lead pipe, consisting in giving the pipe an oval, flattened, or elliptical form and coiling or reeling it by bending in the plane of its greatest diameter, substantially as and for the purposes set forth.

269,687. FAUCET. HENRY B. LEACH, Boston, Mass. Filed Oct. 12, 1882. (No model.) Issued Dec. 26, 1882.



Claim.—1. In a faucet, the combination of the spindle C, provided with one or more arms, C^{11}, the screw-nut H, provided with the slot H^{1} and the recess H^{11}, and the valve I, provided with the valve stem I^{1} and lifting-pin I^{11}, all arranged and constructed substantially as and for the purpose described.

2. In a faucet, the combination of the valve I, provided with the valve-stem I^{1} and lifting-pin I^{11}, and the screw-nut H, provided with the recess H^{11}, and adapted to be turned by means of the spindle C, substantially as and for the purpose set forth.

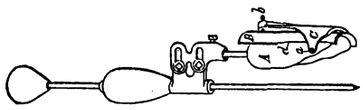
3. In a faucet, the combination of the screw-nut H, provided with the perforation or passage H^{111}, the valve-stem I^{1}, swiveled in said screw-nut; substantially as and for the purpose specified.

4. In a faucet, the combination, with the spindle C, provided with an enlarged base or lower end, of the swivel-plate D and spring F, substantially as and for the purpose described.

5. The combination, with the spindle C C^{11} and valve I I^{1} I^{11}, of the screw-nut H, provided with the stops *h h*, substantially as and for the purpose set forth.

6. The combination, with the spindle C, spring F, and swivel-plate D, of the plate E, substantially as and for the purpose described.

269,784. SOLDERING-TOOL. MAXIMILIAN F. HABER, Baltimore, Md., assignor to the Scott Manufacturing Company, same place. Filed Sept. 12, 1882. (No model.) Issued Dec. 26, 1882.



Claim.—1. In combination with the block A, the soldering-plate B, hinged clamp C, and set-screw *b*, substantially as specified.

2. The block A, having the projections *d*, combined with the clamp C and the soldering-plate B, substantially as specified.

569,268.—FIRE ESCAPE. OSCAR F. DAVIS, TOPEKA, KANS. Filed Jan. 16, 1882. (No model.) Issued Dec. 19, 1882.

269,273. ELECTRIC FIRE ALARM AND EXTINGUISHER, CLARENCE A. EVANS, Upland, Pa. Filled Sept. 9. 1881. Renewed May 13, 1882. (No model.) Issued Dec. 19, 1882.

269,280. CONCRETE ARCH FOR SIDEWALKS AND OVER AREAS. GEORGE GOODMAN, San Francisco, Cal. Filed Aug. 10, 1882. (No model.) Issued Dec. 19, 1882.

269,282. GOVERNOR FOR GAS EXHAUSTERS. ROBERT P. GREEN, Columbus, assignor of one-half to John Anderson, Cincinnati, Ohio. Filed Aug. 15, 1882. (No model.) Issued Dec. 19, 1882.

268,289. PAVEMENT. EDWARD HEYLYN, Brooklyn, N. Y. Filed July 24, 1882. (No model.) Issued Dec. 19, 1882.

269,292. ILLUMINATING BASEMENTS. PETER H. JACKSON, San Francisco, Cal. Filed Oct. 10, 1882. (No model.) Issued Dec. 19, 1882.

269,295. WATER RAISING DEVICE. CHARLES K. KIRBY, San Francisco, Cal. Filed Aug. 26, 1882. (No model.) Issued Dec. 19, 1182.

269,307. GAS BURNER. JAMES G. MILLER, Green Bay, Wis. Filled May 4, 1882. (No model.) Issued Dec. 19, 1882.

269,308. BOILER. JOSEPH R. MITCHELD and [illegible] San Francisco, Cal. Filed May 22, 1882. (No model.) Issued Dec. 19, 1882.

269,310. WELL AUGER. JAMES H. MURRAY, [illegible] Filed June 28, 1882. (No model.) Issued Dec. 19, 1882.

269,324. CAR STOVE. ABRAM REESE, Pittsburgh, Pa. Filed July 24, 1882. (No model.) Issued Dec. 19, 1882.

269,377. FIRE ESCAPE. VITAL BESSIER, New York, N. Y. Filed April 28, 1882. (No model.) Issued Dec. 19, 1882.

269,378. MACHINE FOR MAKING CARBON OR GAS BLACK. ERASTUS R. BLOOD, Erie, Pa. Filed Nov. [illegible] (No model.) Issued Dec. 19, 1882.

269,379. CONDUIT FOR ELECTRIC WIRES. [illegible] BOYER, Lebanon, Pa. Filed Feb. 16, 1882. (No model.) Issued Dec. 19, 1882.

269,389. MANUFACTURE OF ARTIFICAL MARBLE FOR BATH TUBS, &c. REESE P. COUGHLIN, Cincinnati, Ohio. Filed Sept. 23, 1882. (No model.) Issued Dec. 19, 1882.

269,391. STAND AND TANK FOR VAPOR STOVES. JOHN F. DANIELS, Decatur, Ill. Filed Sept. 26, 1882. (No model.) Issued Dec. 19, 1882.

269,409. OIL STONE HOLDER. FRANK H. GOWELL, Boston, Mass. Filed Aug. 16, 1882. (No model.) Issued Dec. 19, 1882.

269,414. PUMP. JESSE A HEYDRICK, Barnhart's Mills, Pa. Filed July 14, 1832. (No model.) Issued Dec. 19, 1882.

269,417. ELECTRIC ARC LAMP. ALFRED G. HOLCOMB, Danielsonville, Conn., assignor to Daniel K. Colborn, New York, N. Y. Filed Feb. 21, 1881. (No model.) Issued Dec. 19, 1882.

269,431. TUBULAR LAMP. JOHN KRUMMENAUER, Brooklyn, assignor to Frederick Dietz, New York, N. Y. Filed Aug. [illegible] 1882. (No model.) Issued Dec. 19, 1882.

269,440. HYDRANT. WILLIAM MCNAMARA, Cleveland, Ohio. Filed June 24, 1882. (No model.) Issued Dec. 19, 1882.

269,448. ROTARY PUMP. JOSEPH MENGE, New Orleans, La. Filed June 21, 1882. (No model.) Issued Dec. 19, 1882.

269,458. ELECTRIC ARC LAMP. WILLIAM S. PARKER, New York, N. Y. Filed June 5, 1882. (No model.) Issued Dec. [illegible] 1882.

269,458. SAFETY STEAM BOILER. GEORGE T. PIMM, Baltimore, Md. Filed Sept. 11, 1882. (No model.) Issued Dec. 19, 1882.

269,466. LAMP. WILLIAM B. ROBINS, Cincinnati, Ohio, assignor to the Alba Light Company, same place. Filed June [illegible] 1882. (No model.) Issued Dec. 19, 1882.

269,470. ELECTRIC CABLE. WILLIAM H. SAWYER, Providence, R. I. Filed Sept. 27, 1882. (No model.) Issued Dec. 19, 1882.

269,480. COMPOSITE PAVEMENT. PETER STUART, Edinburgh, County of Mid-Lothian, Scotland. Filed May 22, 1882. (No model.) Issued Dec. 19, 1882.

469,489. APPARATUS FOR HEATING RAILWAY CARS. MAURICE J. WALSH, New York, N. Y., assignor, by mesne assignments, to Louis Fitzgerald, same place. Filed July 20, 1882. (No model.) Issued Dec. 19, 1882.

269,512. AUTOMATIC FEED WATER REGULATOR FOR STEAM-BOILERS. JOHN CHRISTMAN, Syracuse, N. Y. Filed Sept. 12, 1882. (No model). Issued Dec. 26, 1882.

269,523. PUMP CYLINDER. WILLIAM H. HOLCOMBE and CLIFFORD A. HOLCOMBE, Beloit, Wis. Filed Aug. 7, 1882. (No model.) Issued Dec. 26, 1882.

269,526. APPARATUS FOR SUSPENDING, RAISING and LOWERING ELECTRIC LAMPS. CHARLES C. JENNINGS, Buffalo N. Y., assignor of one-half to James Adams and John F. Moulton, same place. Filed May 4, 1882. (No model.) Issued Dec. 26, 1882.

269 534. SAFETY-VALVE. ALEXANDER ORME, Chicago, Ill. Filed Aug. 7, 1882. (No model.) Issued Dec. 26, 1882.

269,549. DRAIN-PIPE TURNER. WILLIAM W. STICKNEY, St. Louis, Mo. Filed April 18, 1882. (No model.) Issued Dec. 26, 1882.

269,559. ELECTRIC CURRENT METER. ALEX BRENSTEIN, Boston, Mass. Filed Oct. 4, 1882. (No model.) Issued Dec. 26, 1882.

269,568. CONDUIT FOR ELECTRICAL CONDUCTORS. WILLIAM B. ELTONHEAD, Philadelphia, Pa., assignor to Ed. Y. Eltonhead, same place. Filed Aug. 17, 1881. (No model.) Issued Dec. 26, 1882.

269,577. TINNER'S FIRE-POT. JOHN S. HULL, Baltimore, Md. Filed Oct. 18, 1882. (No model.) Issued Dec. 26, 1882.

269,586. FEED-WATER HEATER. EDWARD KENDALL, Cambridgeport, Mass. Filed Aug. 30, 1882. (No model.) Issued Dec. 26, 1882.

269,605. DYNAMO-ELECTRIC MACHINE. ELIHU THOMSON, New Britain, Conn., assignor to the American Electric Company, same place. Filed Sept. 18, 1882. (No model.) Issued Dec. 26, 1882.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MAY 5th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	13	19.5	4	21.0			1								2	2						
Boston.....Mass	407,581	176	22.6	48	27.2	9		22	1	6	11		2			24		12		4			
*Cambridge.....Mass																							
Worcester.....Mass	64,995	20	16.0	5	25.0			3	1	1					1	2	1						
New Haven.....Conn	66,979	20	10.4	3	15.0	2		6		1					1	3		1					
Providence.....R. I.	116,755	42	18.7	13	30.9	1		10	1	1			4		1	3		1					
Total	690,829	271	20.3	73	26.9	12		42	3	9	11		6		3	34	3	14		4			
EASTERN CITIES.																							
Albany.....New York	98,430	54	28.5	13	24.0	2	1	8	4	1		1	1		1	9	2	1	1		1		
New York.....New York	1,299,249	703	28.2	276	39.2	36	5	118	5	16	25	4	6	9	31	91		42		22	6	2	6
Brooklyn.....New York	633,763	243	19.9	90	37.0	8		31	6	1	8			4	12	31	2	10			3		2
*Hudson Co.....New Jersey																							
*Newark.....New Jersey																							
Camden.....New Jersey	54,012	13	12.5	3	23.1			4					1	1									
Paterson.....New Jersey	58,324	31	27.6	9	29.0			7		1					1	5		1					
Philadelphia.....Pa.	907,043	388	22.2	144	37.1	7	3	66	4		28	3	3	2	15	43	8	8		1		5	1
*Reading.....Pa																							
Wilmington.....Delaware	46,889	17	18.7	3	17.6			5		1												1	
Total	3,097,710	1,449	24.3	538	37.1	53	9	239	19	20	61	8	11	16	60	179	12	62	1	23	10	8	9
LAKE CITIES.																							
Buffalo.....New York	168,702	80	34.6	32	40.0	2	2	15	1		2		2		4	13	3	1			3		2
Rochester.....New York	92,116	34	19.1	7	20.5		1	8					3			2		1					
*Syracuse.....New York																							
Cleveland.....Ohio	194,000	56	14.6			2		7	1	3	2					5		1			1		
Detroit.....Michigan	131,118	58	23.0	26	44.8			8	2		12		2		1	5	1	1					
Chicago.....Illinois	597,834	200	17.4	86	43.0	8	1	26	5	3	12		4	2	6	13	1	6		2	1		1
Milwaukee.....Wisconsin	135,233	53	21.3	27	50.9	1	2	4	1	1	4	1			3	4	1	2	2				
Total	1,319,003	481	19.0	178	37.0	13	6	68	10	7	34	1	11	2	14	42	6	12	2	2	5		3
RIVER CITIES.																							
*Allegheny.....Pa																							
Pittsburgh.....Pa	191,523	65	17.6	20	30.7	7		10		1	3				3	9		2			3	1	4
Cincinnati.....Ohio	267,767	103	20.0	47	45.6	3		18	1	3	2	2			3	9	3	3		3			6
Dayton.....Ohio	41,648	8	10.0	2	25.0			4															
*Louisville.....Ky																							
Indianapolis.....Indiana	86,529	32	19.8	15	46.8	1		6				1	2		1		2			3		1	
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	25	13.2	6	24.0		1	8		1	2					3							
*St. Paul.....Minn																							
*St. Louis.....Mo																							
Total	685,493	233	18.1	90	38.6	11	1	46	1	5	7	3	2		7	21	5	5		6	3	2	10
PACIFIC CITIES.																							
*San Francisco.....Cal																							
SOUTHERN CITIES.																							
District of Columbia.....Wh.	136,471	47	17.9	14	29.9	1		8		3	2			1	3	5		2					
" " .....Col.	71,103	45	32.9	17	37.7			11		2	1			2		6		1					1
Richmond, Va.....Wh.	40,000	10	13.0	4	40.0			1										2					
" Va.....Col.	30,684	15	25.4	3	20.0			4								1							
Charleston, S. C.....Wh.	22,699	12	27.3	2	16.6											1							
" S. C.....Col.	27,595	14	26.4	6	42.8			4										1					
Atlanta, Ga.....Wh.	25,583	5	10.1	1	20.0					2													
" Ga.....Col.	19,221	12	32.4	6	50.0			3		2			2				2						
*Savannah, Ga.....Wh.																							
" Ga.....Col.																							
Nashville, Tenn.....Wh.	31,993	17	28.6	6	35.2			3					1			1	1					2	
" Tenn.....Col.	19,406	15	40.1	8	53.3			3							1	2	1						
Memphis, Tenn.....Wh.	18,677	4	11.1	1	25.0		1	1					1										
" Tenn.....Col.	14,896	12	41.9	6	50.0		1	1								2				1	1		1
*Mobile, Ala.....Wh.																							
" Ala.....Col.																							
New Orleans, La.....Wh.	163,757	65	20.6	14	21.5	2		5		5		1		3		3						14	1
" " La.....Col.	59,866	54	46.9	15	27.7	3		6		2				4		3		1				20	
Total White	439,180	150	18.3	32	21.3	3	1	18		10	2	1	2	4	3	10	1	4				16	1
Total Colored	242,771	167	35.8	61	36.5	3	1	32		6	1		2	6	1	14	3	3		1	1	20	2
Total in 30 U. S. Cities	6,474,986	2,751	22.0	972	35.3	95	18	445	33	57	116	13	34	28	88	300	30	100	3	36	19	46	25
April 21—Total in 28 English Cities	8,620,975	3,807	23.0			143				34	29		55		61					65		6	101
April 21, " 8 Scotch Cities	1,233,088	653	27.5			13				10	13		7		10			133		34			40
April 14, " 16 Irish Cities	854,731	498	30.3			4		76		5	2		7		9			136		1			13
April 21, " 16 " "	854,731	497	30.2			8		68		9	1		3		12			148		3			13
April 7, " 170 German Cities	8,704,088	4,642	27.7	1993		121		763	30	169	129		42		70			689		78	18	2	58

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

Notes and Abstracts.

Of an urban population of 6,474,986, there died during the week ending May 5, 2,751 persons, which is equivalent to an annual death rate of 22.0, a decrease from the average for the preceding four weeks, *viz.*, 23.5.

For the North Atlantic cities the rate was 20.3; for the Eastern cities, 24.3; for the lake cities, 19.0; for the river cities, 18.1; and in the Southern cities, for the whites, 18.3, and for the colored, 35.8.

Of the whole number of deaths, 35.3 per cent. were under five years of age, an increase on the average for the preceding four weeks, *viz.*, 33.2.

Accidents caused 3.4 per cent. of all deaths.

Consumption caused 16.1 per cent. of all deaths. In the North Atlantic cities it caused 15.4; in the Eastern cities 16.4; in the lake cities 14.1; in the river cities 19.7, and in the Southern cities, for whites, 12.0, and for colored 19.1 per cent.

Croup caused 1.1, diarrhœal diseases 2.0, and diphtheria 4.1 per cent. of all deaths. In the Southern cities diarrhœal diseases 6.6 per cent. of all deaths In the North Atlantic cities diphtheria caused 4.0; in the Eastern cities 4.2; in the lake cities 7.0, and in the river cities 3.0 per cent, while in the Southern cities it caused none.

Typhoid fever caused 1.2, malarial fever 1.0, and scarlet fever 3.1 per cent. of all deaths. The highest rate from typhoid was in the lake cities (2.2), and the lowest in the Eastern cities (0.7). The

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highest rate from malarial fever was in the Southern cities, for the whites, (3.5). The highest rate from scarlet fever was in the Eastern cities (4.1).

Pneumonia caused 10.9, congestion of the lungs 1.0, and acute bronchitis 3.6 per cent. of all deaths. In the North Atlantic cities pneumonia caused 12.5; in the Eastern cities 12.3; in the lake cities 8.7; in the river cities 9.0; and in the Southern cities, for whites, 6.6, and for colored 8.3 per cent.

Measles caused 1.3, small-pox 1.6, and whooping cough 0.9 per cent. of all deaths. In the river cities the rate of whooping cough was 4.2 per cent. of all deaths. The chief mortality from small-pox continues to be in the City of New Orleans.

FULTON, ILL.—Dr. C. W. Clendenin reports the continued prevalence of measles.

PITTSBURGH, PA.—Dr. W. Snively reports one new case of small-pox.

BOSTON, MASS.—C. E. Davis, Jr., reports 25 new cases of diphtheria, 17 of scarlet fever, four of typhoid fever and two of typhus fever.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Franklin reports 1,366 insane patients remaining under treatment on May 5. During the week which ended on that day there were seven admissions, two discharges and two deaths.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports seven new cases of diphtheria and 30 of scarlet fever. On May 5 there remained under treatment in the city 12 reported cases of the former disease and 62 of the latter.

DETROIT, MICH.—Dr. O. W. Wight reports 27 cases of diphtheria and 17 of scarlet fever.

PROVIDENCE, R. I.—In his report for the week ending May 5, Dr. E. M. Snow has the following remarks: "The new cases of typhoid fever have almost entirely ceased, and the health of the city seems to be as good as the average for the season. Very erroneous statements have been industriously circulated in papers of other cities in regard to the health of Providence. The truth is that, generally for a year past, the rate of mortality has been less in Providence than in Boston or New York. In the last month, April, the number of deaths in Providence was larger than in any other month for a year, except November, and the annual *rate* of mortality was 23,33 in each 1,000 of the population; but the rate in Boston in the same month was 26.32 in each 1,000, according to the report of the City Registrar of Boston.

BALTIMORE, MD.—The return of the Board of Health for the week ending May 5, shows a total of 156 deaths; males 84, females 72; under five years 51, over 60 years 26. The annual death rates as calculated by the local authorities are, for the whole population 19.83, for the white 17.28, and for the colored 34.66. Small-pox caused six deaths, measles one, scarlet fever six, typhoid fever one, malarial one, croup two, diphtheria five, diarrhœal diseases two, erysipelas two, puerperal fever one, consumption 29, bronchitis three, pneumonia 13, cerebro-spinal meningitis three and violence six.

MICHIGAN.—During the week ending April 28 the diseases which mainly prevailed in the State were, rheumatism, neuralgia, bronchitis, intermittent fever, consumptiom, tonsilitis, influenza and pneumonia. Diphtheria was reported present at 10 places, scarlet fever at 18 places and measles at 22 places. As Dr. Baker makes no mention of small-pox it is inferred that the State continues free from this disease poison.

NEW HAMPSHIRE.—Dr. C. W. Chamberlain, Secretary State Board of Health reports that, during the month of March, acute lung diseases and influenza prevailed often almost in an epidemic form. Malarial diseases generally have been much less frequent than during last year. Scarlet fever has not been as prominent as it was earlier in the year; yet measles, scarlet fever and whooping cough are each rather more prevalent than diphtheria, except in a few localities. Erysipelas has been reported rather mere frequently than usual. "It is thought probable that a proper law could now be passed regulating the isolation of persons having contagious diseases of the types especially that readily become epidemic, and regulating attendance at schools of persons from towns where a case of such disease existed, although it was rejected a year ago."

KNOXVILLE, TENN.—Dr. S. B. Boyd, Secretary of the Board of Health, has transmitted his report for 1882, to the mayor and aldermen. We make some extracts from his statistics. The population of 17,151—white 12,643, colored 4,508—is taken from the enumeration by the Standard Directory Company, August 1, 1882. There were 365 deaths in the city and suburbs; white 225, males 126, females 99; colored 140, males 60, females 80. In calculating the rate the deaths of 41 non-residents are omitted. The rate for the whole population was 18.89, for the white people 15.89, and for the colored people 27.28. These rates are in excess of those of last year, and the infant mortality which was 32.11 per cent. of the total in 1881 was increased in 1882 to 39.45 per cent. There were 201 cases of scarlet fever reputed, 33 of which proved fatal; 53 of diphtheria, with 11 fatal, and about 300 of typhoid fever, with 26 fatal. Cholera infantum caused seven deaths, consumption 47, acute bronchitis four, croup four, pneumonia 25, dysentery three, whooping cough three, measles one, small-pox six, violence 7.

ONTARIO, CANADA.—The *Bulletin* for the week ending April 28 reports as the most prevalent diseases bronchitis, anæmia, neuralgia and influenza Intermittents and diarrhœas are advancing. Measles constitutes 5.7 per cent. of the observed diseases. Mumps has receded considerably and scarlet fever has decreased. Cerebro-spinal meningitis has appeared in one of the districts.

RIO DE JANEIRO.—Consul-General C. C. Andrews reports yellow fever increasing and declared epidemic during the week ending March 31. Not including reports from the Hospital Santa Isabel there were 73 deaths reported from this fever in a total mortality of 353 which occurred during the week. The shipping continues free from the infection. Small-pox caused eight deaths, typhoid fever five, typhus fever two, pernicious fever 15 and consumption 45; population 330,000.

GEORGETOWN, DEMERARA.—Consul Figyelmesy sends a mortality report for March, showing 224 deaths in a population of 47,175. Of these 125 occurred in hospitals and other public institutions, and two among the shipping, while 48 were infants under one year, and 49 persons in the city over one year of age. Diarrhœa caused 24 deaths, consumption 31, leprosy six, croup one, erysipelas one, puerperal fever one and acute lung diseases four.

NEW AMSTERDAM, DEMERARA.—Consul Figyelmesy sends also a report from New Amsterdam for March, showing 33 deaths in a population of 8,124. Of the decedents in the city seven were under one year, and six were over that age; the remaining twenty deaths occurred in the public institutions. No disease was specially prevalent.

ENGLAND.—The return of the Registrar-General for the week ending April 21 shows an average rate of mortality equal to 23.0 per 1,000 annually in the 28 large towns. Bradford gave the lowest rate, 16.3, and Blackburn the highest, 30.8. No death was referred during the week to any of the principal zymotic diseases in Huddersfield. The highest rates from whooping cough were in Derby, Manchester and Hull, from measles in Manchester, and from scarlet fever in Birkenhead. Diphtheria caused 19 deaths in London, two in Portsmouth, two in Birmingham and two in Preston. Small-pox caused two deaths in London, two in Wolverhampton, one in Leeds, and one in Newcastle-upon-Tyne.

London.—Births 2,607; deaths 1,755; the former were 97 below, while the latter were 33 above the average numbers in the corresponding weeks of the last ten years. Annual rate 23.2 Small-pox caused two deaths, measles 46, scarlet fever 21, diphtheria 19, whooping cough 40, typhoid fever 10, and diarrhœa and dysentery 13.

SCOTLAND.—Consul J. A. Leonard, transmits the return of the Registrar-General for the week ending April 21, a summary of which is given in our table. The average death rate was 27.5 per 1,000, or 4.3 above that of the corresponding week of last year. Aberdeen recorded the lowest mortality, 16.7; and Glasgow the highest 33.8. The prevailing epidemics were whooping cough and measles, deaths from measles being most frequent in Glasgow (27) and from whooping cough in Glasgow (21) and Dundee (12). There were some diminution in the number of deaths from acute lung diseases.

Edinburgh.—Total deaths 91; rate 20.1. No death was registered from small-pox, scarlet fever, typhoid fever or diarrhœal diseases. Measles caused one death, diphtheria two, whooping cough two, acute lung diseases 20 and violence one.

SCOTLAND.—The Registrar-General's returns for the months of February and March have been received:

During February 3,310 children were born in the eight principal towns; of these 1,685 were males and 1,625 females. Illegitimate births formed 8.4 per cent. of the whole. The deaths of 2,580 persons were registered of whom 1,253 were males and 1,287 females. This mortality is 57 below the average for the month during the last ten years. The rates were as follows: Aberdeen 18 per 1,000, Leith 20, Edinburgh 21, Perth 23, Dundee 26, Greenock 27 and Glasgow and Paisley 28. Deaths of children under five years constituted 40.3 per cent. of the total. Whooping cough which was the most fatal epidemic caused 196 deaths or 7.6 per cent of the whole; in Dundee, Glasgow and Aberdeen the deaths from this disease were respectively 14.6, 8.4 and 7.9 per cent. of the total deaths. Fever caused 41 deaths of which 10 were registered as typhus. Scarlet fever caused 44 deaths, croup 29, diarrhœa 28, measles 26, diphtheria 26, metria four, dysentery one, acute lung diseases 646 or 25.0 per cent, consumption 259 or 10.0 per cent. and violence 73 of which three were suicidal.

During March the births numbered 3,540; males 1,828, females 1,712; illegitimacy 7.4 per cent. The deaths amounted to 2,908; males 1,459, females 1,449. This mortality is 19 above the average, rates:—Aberdeen and Edinburgh 20 per 1,000, Perth 22, Paisley 24, Greenock 26, Leith 29, Dundee 30 and Glasgow 33. Deaths of children under five constituted 41.1 per cent. of the total; in Perth these deaths formed only 24 per cent., in Leith 46 per cent. Whooping cough continued fatal having caused 218 deaths or 7.5 per cent. of the whole mortality. In Dundee this percentage amounted to 12.8, in Perth 12.1 and in Paisley 9.6. Fever caused 53 deaths, 15 of which were attributed to typhus. Measles caused 83 deaths, 74 of which occurred in Glasgow. Diarrhœa caused 37 deaths, scarlet fever 35, diphtheria 32, croup 26, metria seven, dysentery two, acute lung diseases 755 or 26.0 per cent. of the total, consumption 306 or 10.5 per cent. and violence 90, of which seven were suicidal.

IRELAND.—Consul A. B. Wood sends the return of the Registrar-General for the week ending April 14. For a summary of this return see table on preceding page.

DUBLIN.—Deaths 216 or 32.1 per 1,000. No death was recorded from small-pox, measles, scarlet fever or diphtheria; typhoid fever caused six deaths, typhus three, diarrahœa two, whooping cough five, consumption 31, acute lung diseases 57, and violence three. Population 349,685.

BELFAST.—Deaths 130 or 31.6 per 1,000. No death was reported from small-pox or measles. Typhoid fever caused one death, and typhus one, scarlet fever eight, whooping cough six, diphtheria two, diarrhœa one, consumption 27, acute lung diseases 35, and violence two. Population 214,022.

Consul Wood sends also the returns for the week ending April 21.

DUBLIN.—Births 288, deaths 241; equal to annual rates of 42.8 and and 35.8. No death was registered from small-pox, measles or diphtheria. Scarlet fever caused one death, typhus four, whooping cough 11, typhoid two, diarrhœa and dysentery four, consumption 36, acute lung diseases 63 and violence six.

BELFAST.—Births 124, deaths 107; equal to the rates 30.1 and 26.0. No death was registered from small-pox, measles, typhus or diphtheria. Scarlet fever caused 10 deaths, whooping cough one, typhoid fever one, diarrhœa and dysentery three, consumption 19, acute lung-diseases 35, and violence one.

IRELAND.—During the year 1882, there were registered [illegible] and 21,886 deaths in the 16 urban sanitary districts. The former number is equal to a rate of 29.7 per 1,000 of the aggregate population of 843,553 inhabitants, and the latter to a rate of [illegible]. Small-pox caused 97 deaths, of which 82 occurred in Belfast and [illegible] in Waterford. Measles caused 815 deaths, scarlet fever [illegible], typhus [illegible], whooping cough 206, diphtheria 74, ill defined fevers [illegible], typhoid fever 224, diarrhœa and dysentery 677, consumption [illegible], acute lung diseases 4,722 and violence 397.

DUBLIN.—In the city and suburbs the births numbered [illegible] and the deaths 9,461, equal to the respective rates of 28.9 and [illegible]. No death occurred from small-pox. Measles caused 563 deaths, scarlet fever 35, typhus 83, whooping cough 81, diphtheria 31, typhoid fever 132, diarrhœa and dysentery 238, consumption 1,144, acute lung diseases 2,068, and violence 232.

BELFAST.—Births 6,820, deaths 5,365; equal to the rates of [illegible] and 25.8. Small-pox caused 82 deaths, measles 111, scarlet fever [illegible], typhus 55, whooping cough 65, diphtheria 25, typhoid fever [illegible], diarrhœa and dysentery 218, consumption 799, acute lung diseases [illegible] and violence 95.

PARIS, FRANCE.—During the week ending April 12 there were registered 1,270 deaths, equivalent to an annual mortality rate of [illegible]. Typhoid fever caused 25 deaths, small-pox nine, measles [illegible], scarlet fever four, whooping cough nine, diphtheria and croup 35, erysipelas eight, puerperal fever nine, consumption 229, acute bronchitis [illegible], pneumonia 147, and violence 43.

On April 8 there remained under treatment in the hospitals [illegible] cases of small-pox, 243 of typhoid fever, and 32 of diphtheria.

During the year 1882 there were 58,702 deaths reported, of which 17,411 were of children under five years of age. Consumption caused 10,342 deaths. Epidemic diseases caused 5,579 deaths, [illegible] typhoid fever 3,352, small pox 661, measles 1,018, scarlet fever [illegible], diphtheria 2,390. The suicides numbered 767, males 612 and females 155. Lastly 5,170 still births were registered.

RHEIMS, FRANCE.—Consul John L. Frisbie reports 62 deaths as having taken place during the week ending April 7; males 35, females 27; under five years 39, over 60 years nine. Annual rate [illegible]. No death was reported from small-pox, scarlet fever, typhoid fever, whooping cough, erysipelas or puerperal infection. Croup and diphtheria caused five deaths, measles four, pneumonia five, bronchitis four, pleurisy two, consumption four, and violence two.

STOCKHOLM, SWEDEN.—Consul Nere A. Elfwing sends report for the week ending March 31. The deaths numbered 86; males [illegible], females 38; under five years 30, over 60 years 20. Annual rate [illegible]. Measles caused one death, scarlet fever four, whooping cough one, croup and diphtheria four, diarrhœa four, consumption 16, pneumonia 14, bronchitis one and violence three.

During the week ending April 7 cases of disease were reported as follows: Small-pox, puerperal fever, cerebro-spinal meningitis, [illegible], dysentery and epidemic diarrhœa none, measles 19, scarlet fever [illegible], typhus one, erysipelas five, whooping cough ten, diphtheria [illegible], croup one, typhoid fever eight, tonsilitis 14, pneumonia 25, pleurisy one, bronchitis 85 and diarrhœa 24.

COPENPAGEN, DENMARK.—During the week ending April [illegible] deaths occurred, of which number 58 were of children under five years of age. This mortality is equal to an annual rate of 24.43. No death occurred from measles, scarlet fever or erysipelas. Diphtheria caused one death, croup three, whooping cough five, typhoid fever two, diarrhœa two, puerperal fever one, consumption 11, pneumonia 11, pleurisy one, acute bronchitis eight, and violence one.

During the same week cases of disease were reputed as follows: Small-pox one, measles one, scarlet fever 12, diphtheria 14, croup one, whooping cough 77, typhoid fever six, dysentery one, diarrhœa 83, erysipelas 25, puerperal fever seven, bronchial catarrh 334, pneumonia 62 and tonsilitis 155.

BRUSSELS, BELGIUM.—During the week ending April 7, there occurred in Brussels and its suburbs 284 births and 249 deaths, equal respectively to annual rates of 35.5 and 32.3 per 1,000. The deaths of children under five years numbered 81. No death was registered from croup or scarlet fever. Diphtheria and whooping cough caused one death each; measles and typhoid fever four each, small-pox six, diarrhœal diseases 13, bronchitis and pneumonia 41 and consumption 36.

VIENNA, AUSTRIA.—Consul-General Weaver reports 538 deaths, equivalent to an annual rate of 37.3 per 1,000 as having been registered during the week ending April 7. Small-pox caused two of the deaths, scarlet fever two, diphtheria three, whooping cough eight, typhoid fever two, consumption 147, and acute lung diseases 106. Of the deaths 190 occurred in children under five years of age.

ST. PETERSBURG, RUSSIA.—Consul Edgar Stanton reports 730 deaths as having occurred during the week ending March 31; males 402, females 328; under five years 231, over 60 years 96. Population 929,525. Six deaths are reported from small-pox, 45 from fevers, of which two are indicated as from typhus, 15 from recurrent fever, 25 from typhoid and three from typhoid without specific form. On April 1 their remained under treatment in the hospitals 1,212 cases of fever, 28 of small-pox and 1,254 of venereal disease.

BOMBAY, INDIA.—Consul B. F. Farnham transmits reports for the weeks ending March 20 and 27. During the former period there were 619 deaths, or 165 more than during the week ending March 21, 1882, and 135 more than the mean of the corresponding period in the past five years. There were 113 deaths from remittent fever. One death from cholera was reported. There was a slight falling off in the number of deaths from small-pox, 123 being reported, as compared with 131 in the previous week. Acute lung diseases caused 66 deaths, diarrhœa 17 and dysentery 11.

During the latter week the deaths numbered 511, or only four more than the mean of the corresponding weeks in the previous five years. The annual rate calculated from this mortality was 31.28. Remittent fever caused 75 deaths, acute lung diseases 78, diarrhœa 29 and dysentery 13. Small-pox shows an inclination to decline, as only 93 deaths were reported, as compared with 123 during the preceding week.

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STATE BOARD OF HEALTH.

The New York State Board of Health held its annual meeting at the capital, on May 9. Present were Dr. Edward M. Moore, president; Hon. Erastus Brooks, Dr. J. Savage Delavan, Dr. William M. Smith, Dr. James G. Hunt, Attorney General Russell, and Dr. Elisha Harris, secretary. After the reading of the minutes, a complaint of a source of malaria brought by a delegation from Fort Edward was discussed and referred to the committee on drainage, sewerage and topography. The election of officers resulted in the unanimous re-appointment of Dr. Edward M. Moore as president, and Dr. Elisha Harris as secretary. The standing committees of last year were continued. The finance committee reported that the finances were in a sound condition. The committee on stench nuisances urged the prompt suppression of the Kill-von-Kull nuisance opposite Staten Island. An inspector was allowed the committee to enforce executive orders against the premises of all refineries in the Newtown creek region.

Dr. Smith pointed out the importance of increased restrictions upon the sources of infection through emigrants and emigrants' clothing. Two emigrant-train inspectors will be employed by the Board's sub-committee. Copies of the Board's opinion with regard to the national Board of Health were directed to be sent to the President of the United States and the Secretary of the Treasury. The investigation of preventable diseases was ordered to be continued throughout the State. Accordingly, the necessary means to continue the work were voted.

The drainage work on the Genesee Valley canal was reported complete. Under the head of increased means for inspecting dangerous illuminating oils, the Board ordered the work prosecuted to the extent of its resources, and an additional inspector was ordered to be appointed for the western part of the State, and a communication was directed to be sent to all the district attorneys of the State concerning the strict enforcement of Chapter 292 of the Laws of 1882. The Board ordered its adherence to the principles involved in the recent law of Congress for the prevention of the adulteration and sale of adulterated teas, and approved of the means by which the first cargo of this adulterated tea had been seized and confiscated under this law.

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New Advertisements.

EMPLOYMENT WANTED. P. 568.

PROPOSALS. P. 568.

D. VAN NOSTRAND, New York. Publisher. P. 568.

THE ODORLESS EXCAVATING CO., Baltimore, Md. P. 569.

LOCKE BROS., Salem, Mass. Eureka Steam Trap. P. 570.

HAY & PRENTICE, Chicago, Ill. Steam Warming Apparatus. P. 570.

PANCOAST & MAULE, Philadelphia, Pa. The Junior Eclipse Pipe Cutting Machine. P. 570.

MEYER, SNIFFEN & CO., New York & Boston, Mass. Hellyer Water Closet, Hellyer Artizan Hopper and Model Slop Sink. P. 573.

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Address, W. G., Jr., care of The Sanitary Engineer.

A PRACTICAL Steam Fitter and Mechanical Engineer who has had 14 years' experience in fitting up factories, etc., with gas, steam, water and the planting of machinery in general, desires a permanent situation in either a factory or a hotel.
Address, J. R., Yonkers, N. Y.

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Address, S. J. D., care of The Sanitary Engineer.

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Address, James Williamson, 60 Montgomery St., Jersey City, N. J.

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A YOUNG MAN that understands plumbing and gas fitting, would like to get job in first-class shop to finish his trade. Address,
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SITUATION wanted by a married man (28), as Engineer; steady sober and attentive. Good references.
A. EATON, 65 McKibbin St., Brooklyn, E. D.

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WM. HORAN, 24 Cornelia St., City.

TO BOSS PLUMBERS.— A well-educated young man (21), now employed as book-keeper in a large manufactory, desires to learn Plumbing, Gas and Steam Fitting. Is large, strong, not afraid of hard work, and if wanted, willing to keep books at night. A 1 references. Address, G. M. W., this office.

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Proposals.

PROPOSALS FOR FUEL, FORAGE AND STRAW.

DEPOT QUARTERMASTER'S OFFICE,
HOUSTON ST., COR. GREENE, NEW YORK CITY, *May* 1, 1883.

Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, until 12 o'clock, noon, on the 31st day of May, 1883, at which time and place they will be opened in presence of bidders, for furnishing and delivering Fuel, Forage and Straw required at *New York City, Willet's Point, N. Y. H.*, and *David's Island, N. Y. H.*, during the fiscal year ending June 30, 1884.

The Government reserves the right to reject any or all proposals, or to accept as may be most advantageous to the Department.

A preference will be given to articles of domestic production, conditions of price and quality being equal, and such preference will be given to articles of American production produced on the Pacific coast to the extent of the consumption required by the public service there.

Blank proposals and printed circulars stating the kind and estimated quantities required at each post, and giving full information as to the manner of bidding, conditions to be observed by bidders, and terms of contract and payment will be furnished on application to this office.

Envelopes containing proposals should be marked:—"Proposals for Fuel, Forage and Straw," and be addressed to the undersigned.
HENRY C. HODGES, *Lt.-Col. and D. Q. M Gen'l, U. S. A.*

NOTICE TO CONTRACTORS.

The Board of Commissioners of Porter County, Indiana, will receive proposals until two P. M., May 24, 1883, for the erection of a Court House in the city of *Valparaiso*. The plans and specifications can be seen at the Auditor's office in Valparaiso, and at the office of J. C. Cochrane, architect, No. 78 Ashland Block, corner Clark and Randolph streets, Chicago. Contractors can obtain printed instructions as to requirements and form of proposals, upon application to the auditor or architect.

[Signed] L. P. SCOTT, N. PICKRELL, F. BURSTROM, } *Board of Commissioners.*

[Attest] W. E. BROWN, *Auditor Porter County.*

PROPOSALS FOR CONSTRUCTION OF POST HOSPITALS.

OFFICE OF CHIEF QUARTERMASTER, DEPARTMENT OF THE EAST,
GOVERNOR'S ISLAND, N. Y. H., *May* 11, 1883.

Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, until 12 o'clock, noon, New York time, on the 31st of May, 1883, at which time and place they will be opened in the presence of bidders, for the construction of a twelve bed hospital, at *Fort Schuyler, N. Y. H.*, in accordance with plans and specifications, which can be seen at the office of the undersigned.

One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising a part of it.

Blanks for proposals, and information as to the manner of bidding, etc., can be obtained at this office. Proposals must be accompanied by a bond, with two sureties, in the sum of two hundred dollars. A proposal not accompanied by such a bond will not be considered.

Envelopes containing proposals should be marked "Proposals for construction of Post Hospital," and addressed to the Chief Quartermaster, Department of the East, Governor's Island, N. Y. H.

The Government reserves the right to reject any or all proposals.
C. G. SAWTELLE,
Deputy Quartermaster General, U. S. A., Chief Quartermaster.

For information as to public work to be done in Kansas City, Mo., during the present season, address,
W. B. KNIGHT, *City Engineer.*

The Secretary of the Navy will receive sealed proposals until noon July 2, 1883, for the construction by contract of three steam crusiers and one dispatch boat.

Designs, specifications and full information may be had by addressing WM. E. CHANDLER,
Secy. of Navy, Washington, D. C.

For furnishing 500,000 granite paving blocks, more or less, will be received until May 21, 1883. For information, address,
Maj. G. J. LYDECKER, *Washington, D.C.*

For the erection of a soldiers' monument until August 1st. Address S. E, Merwin, New Haven, Conn.

For building a brick sewer will be received until May 22d by C. S. Brackenbridge, city civil enginner, Forte Wayne, Ind.

For performance of following work: On Great American Railway between Pugwash and New Glasgow, N. S., a distance of about 70 miles, graduation of road-bed, bridge masonry, wooden bridges, and iron bridges. For further information address Chas. L. Snow, Superintendent of Construction, Pugwash, Nova Scotia.

Proposals for Building Material will be received until May 23, 1883, by C. B. MOORE, *Supervisor N. Y. State Prison, Trenton, N. Y.*

Proposals for the erection of a wrought iron bridge will be received until May 21 by GEO. W. VANALTA, *Chairman, Warden's office, Court House, Trenton, N. Y.*

Proposals for new Bank Building will be received by First National Bank, Newtown, Pa., until May 29, 1883. Specifications of
J. H. HOBB & SON, *Architects,*
520 Walnut Street, Philadelphia, Pa.

Proposals will be received at the office of the Superintendent of the Institution for the Deaf and Dumb, at Columbus, O., till 8 o'clock, A.M., of Saturday, June 9, for the following work: For reconstructing the heating apparatus now in use; for constructing new cold air ducts; for completing ventilating or foul air ducts.

Proposals will be received until 12 o'clock Wednesday, June 6, 1883, for furnishing and laying about 90,000 feet pipe, assorted sizes, also fittings, hydrants and valves; also pumping machinery, water wheel, etc., also for stone building. Specifications can be had of
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*ELEVATORS.—Hydraulic, Passenger, Freight and Side-*walk Elevators, m'f't'd by the *Granville Hydraulic Elevator Co.*, 1193 Broadway, N. Y. Send for Illustrated Circular.

FLUSH TANKS.—The Field Flush Tank, A. G. Myers, American Agent, 94 Beekman St. Send for Pamphlet explaining its various uses.

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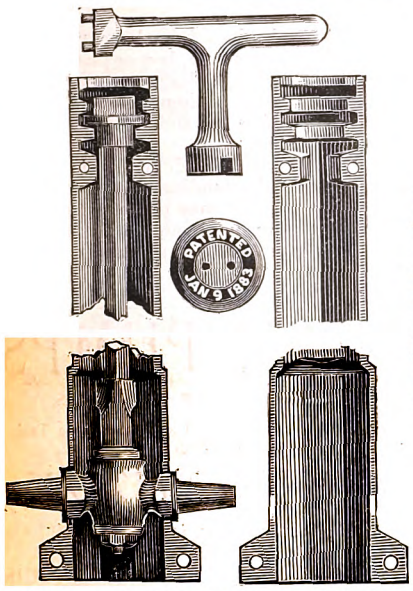

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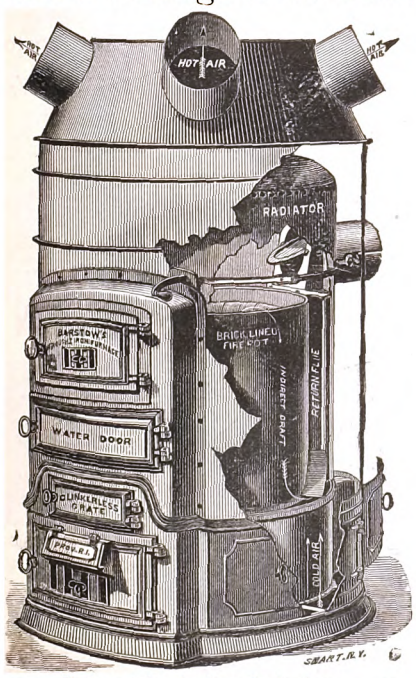

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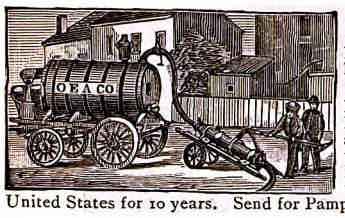

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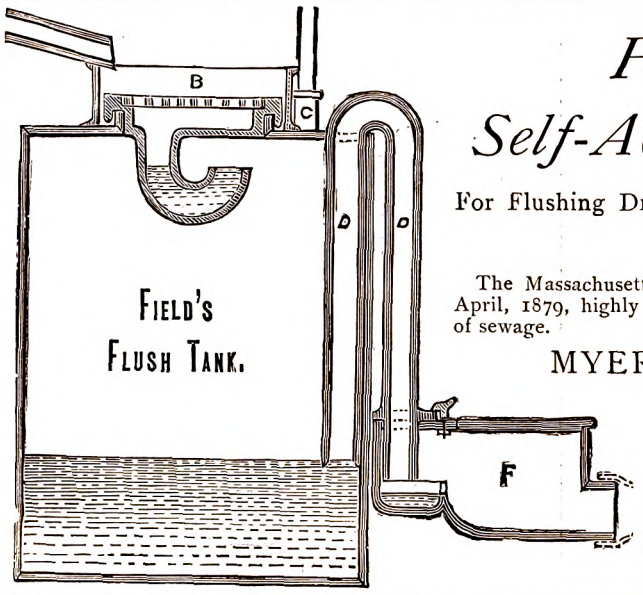

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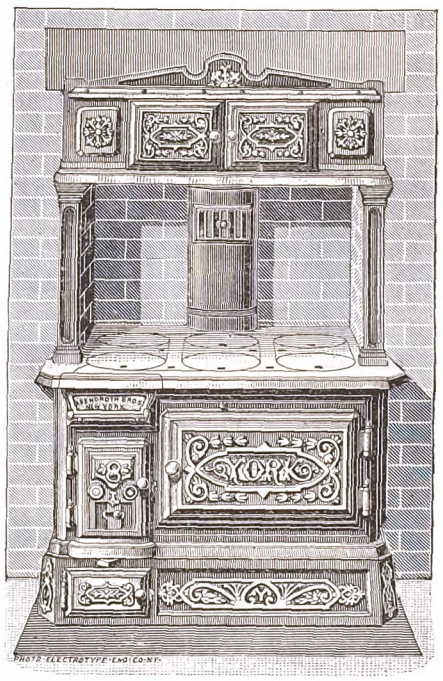

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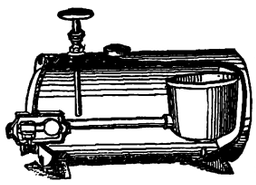

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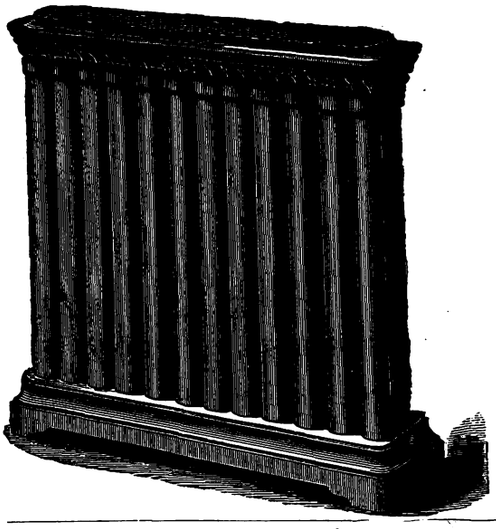

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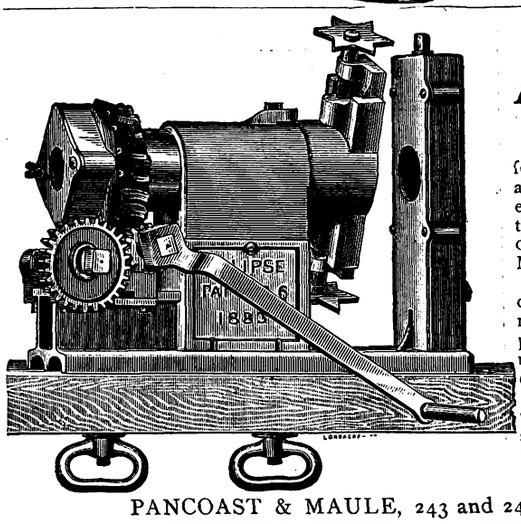

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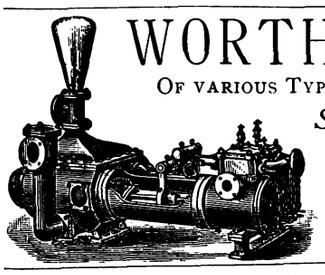

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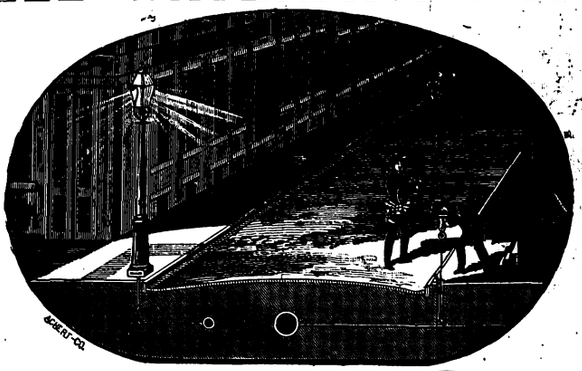

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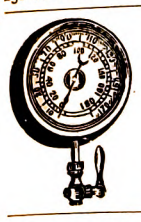

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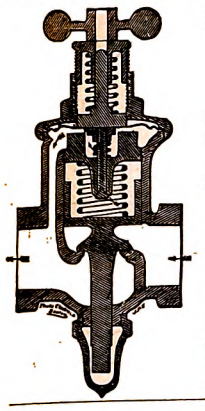

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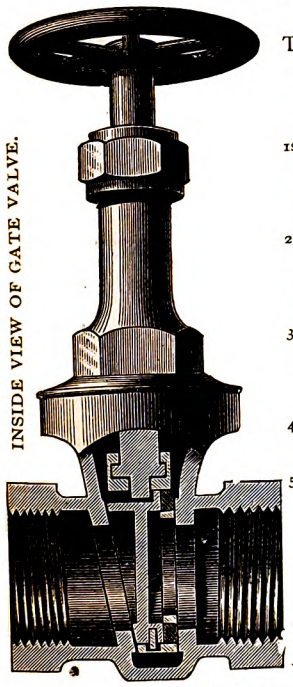

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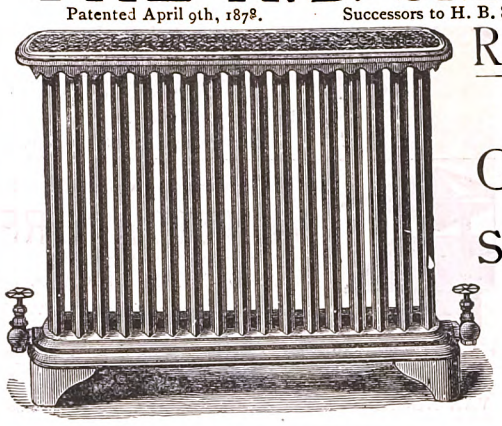

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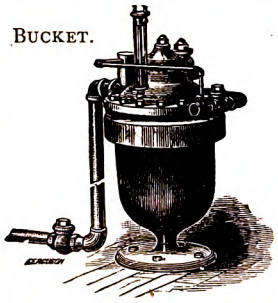

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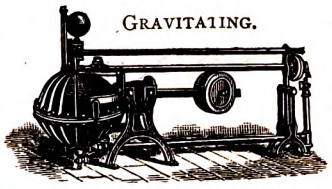

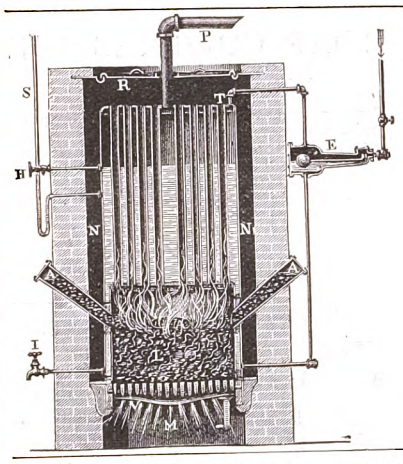

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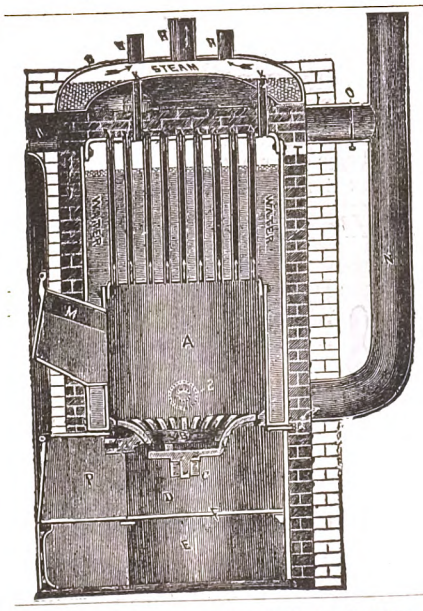

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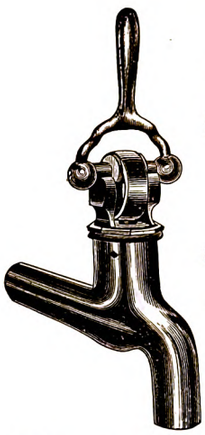

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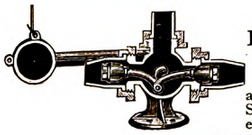

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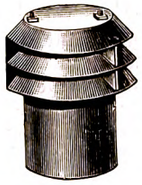

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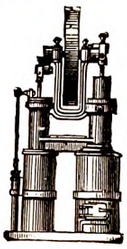

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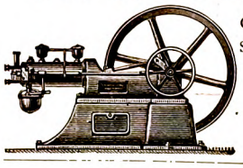

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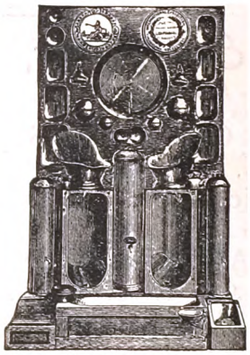

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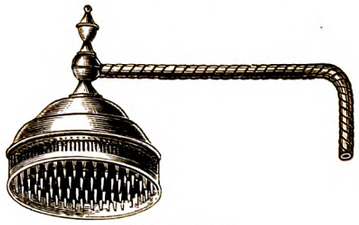

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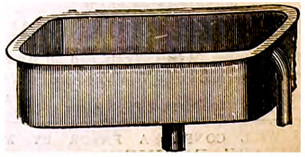

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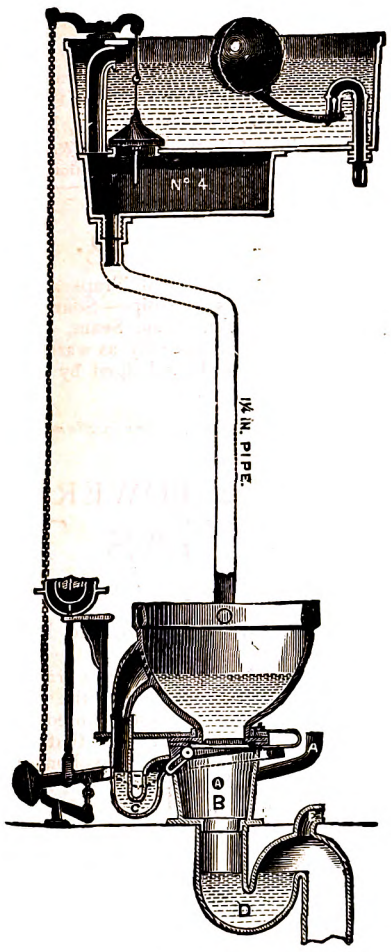
With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



The names of some of the parties using them and those having them for sale with full descriptive circulars, will be mailed on application to us.

MEYER, SNIFFEN & CO.'S No. 3 A

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HELLYER'S *ARTISAN HOPPER*,

WITH IMPROVED FLUSHING RIM.

FLUSHED FROM OUR

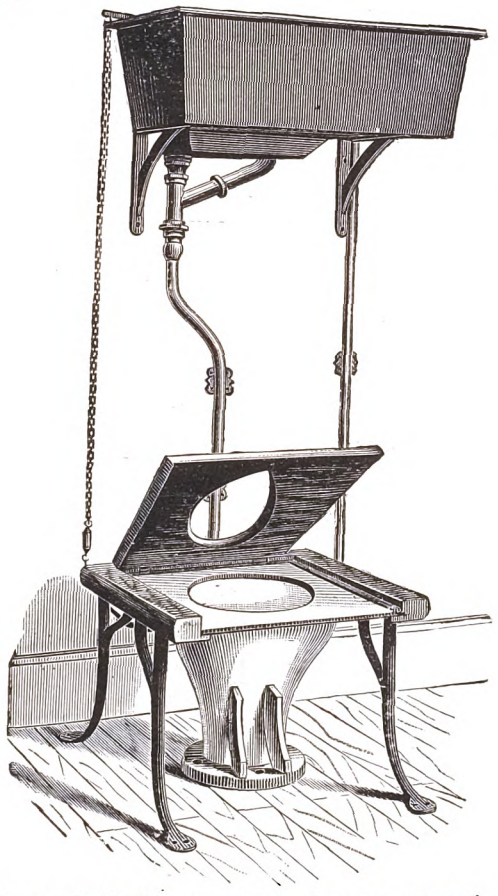
No. 2 A Preliminary Flush Cistern.

PATENTED.

Complete with seat, and all attachments ready for putting up, except lead pipe.

This is an admirable arrangement for Stores, Tenement Houses, Servants' Use, or any public place, where people neglect to lift the handle or properly flush an ordinary Water Closet.

This Hopper is of Earthenware, of novel shape, and with improved flushing rim, when supplied and fitted up as shown herein, always clean. When seat is depressed, a valve is raised, and Service Box filled with water, to extent of two and a half gallons. When seat is relieved of weight, the valve before referred to is closed, another one opened, when the contents are suddenly delivered through an 1¼ pipe to the Hopper, carrying all solid matter through the trap.



By a valuable improvement in the construction of our No. 2 Cistern—which is patented—a preliminary flush of half a gallon is secured, which thoroughly wets the entire inner surface of the hopper. The trickle is dispensed with, thus economizing the use of water, and very much better results are secured.

In ordering, describe as "*Meyer, Sniffen & Co.'s No. 3 A Water Closet Apparatus.*"

These Hellyer Hoppers are sold with various flushing apparatus, their efficiency largely depending on the selection. It is for this reason that we never sell the Hoppers unless we are satisfied that the flushing arrangements are suited for the particular duty required.

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IN ONE PIECE OF EARTHENWARE.

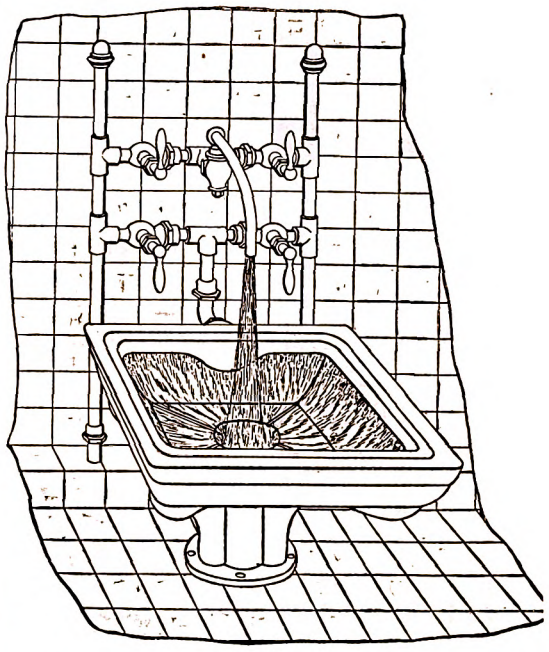
When set on and surrounded by White Glazed Tile, as shown, it makes the cleanest and most useful Slop Sink arrangement we know of.

It is provided with a Flushing Rim similar to the Hellyer Hoppers.

It is sold with the Flushing and Water Supply apparatus, that is made of Brass Pipe, as illustrated, or with a set of Combination Cocks to attach to Lead or Iron Pipes that may be concealed behind the wall.

It is arranged so that no overflow can take place when a pail may be set over the outlet hole and the water carelessly left running.

Persons wanting some such thing will find it worth while to take the trouble to call at our warerooms and examine it.



The apparatus complete, as shown, we designate as—

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We have fitted up Show-rooms at No. 1 Pemberton Square, Boston, where our specialties can be seen. Persons living in Boston and vicinity are invited to call and examine them.

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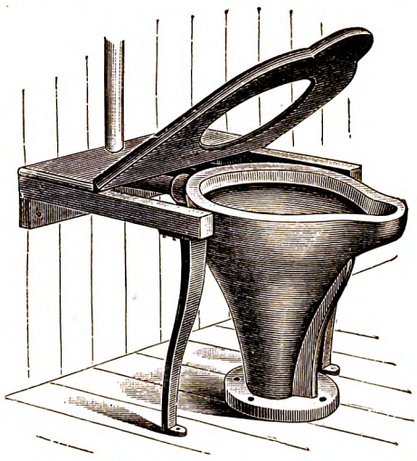

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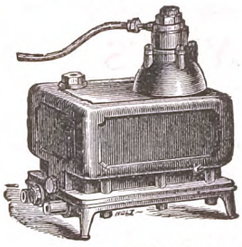

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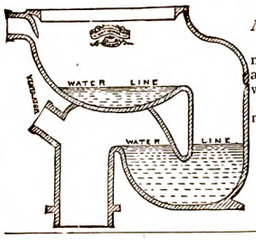

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For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

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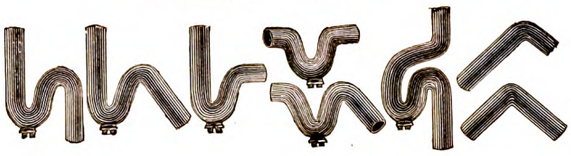

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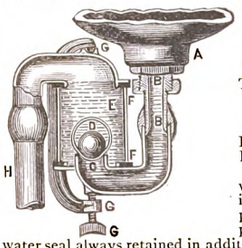

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It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted. Glass or metal section furnished at same price. Send for circular and price list.

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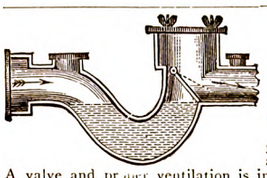

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BACK WATER TRAP

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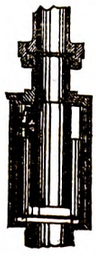

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Cannot siphon out.

Water seal always perfect.

Made of Brass, Porcelain or glass. When of Glass, the workings and benefits of the invention are plainly seen. Send for illustrated Circular. Address,

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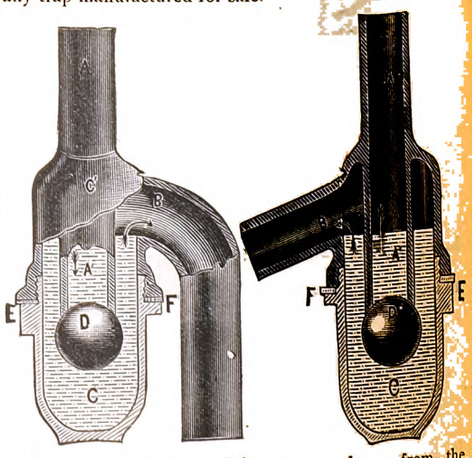

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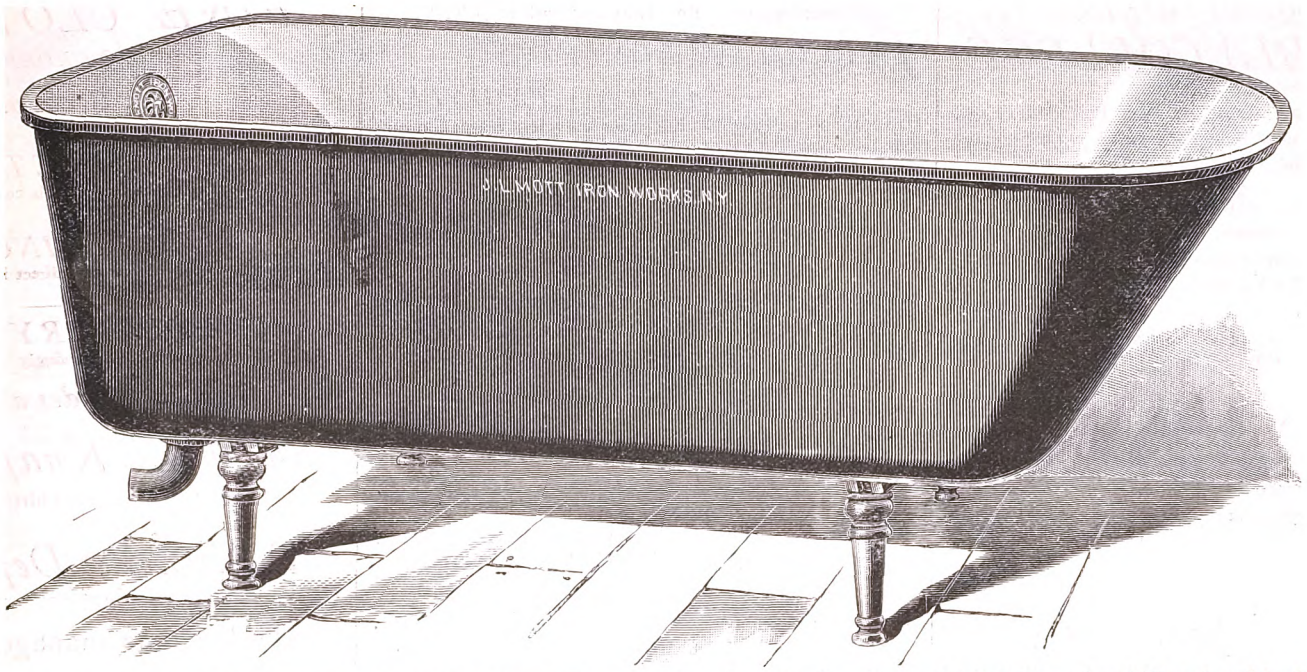
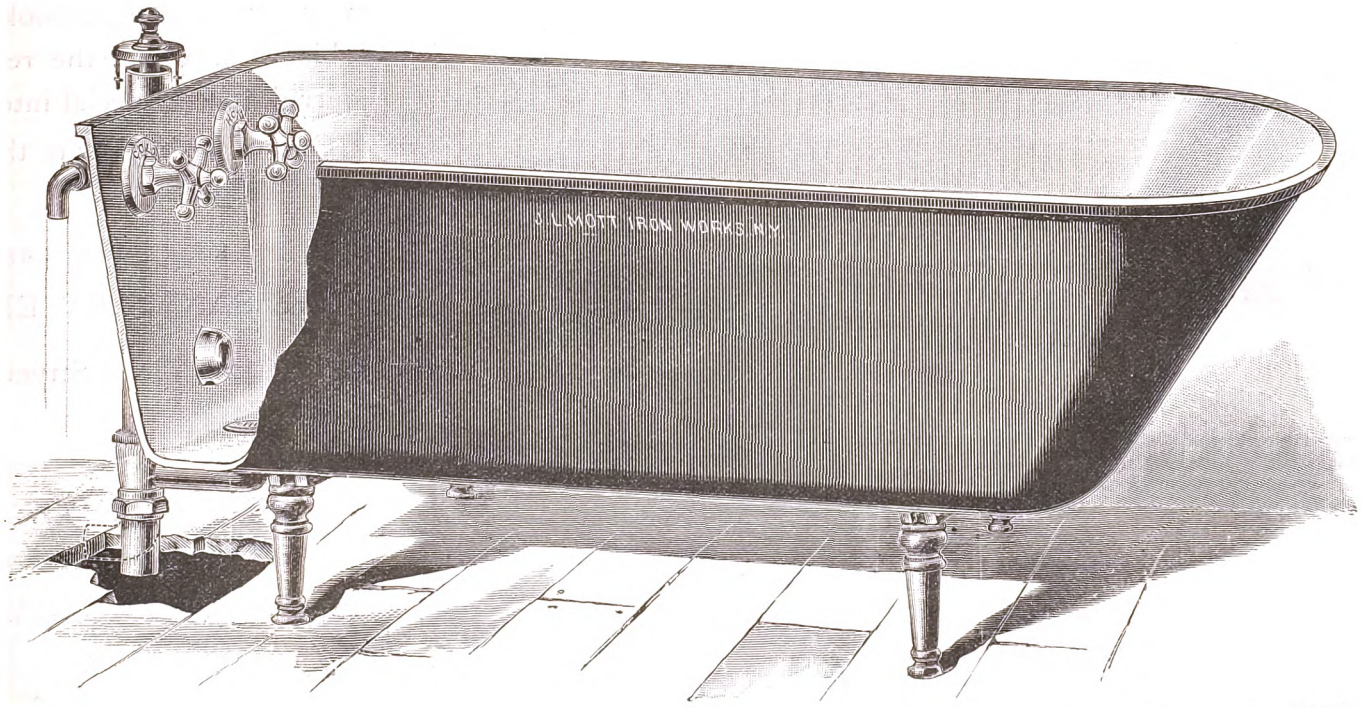


Shows Bath with Overflow and Waste Coupling—Plug and Overflow Strainer being Nickel Plated and Plug furnished with Rubber Stopper.



Shows Bath with Nickel Plated Cocks, Bottom Supply and "McFarland" Waste Fixtures complete. Fixtures furnished Silver Plated to order.

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SANITATION AND PATERNAL GOVERNMENT.

Under the title of "economy in sanitation," Capt. Douglas Galton recently read a paper before the Society of Arts, in which he advocated a great extension of the powers and duties of local authorities in relation to sanitary matters, and more especially to the subjects of house drainage and the providing of healthy habitations for the poor. Taking the ground that house drains are a part of the sewerage system of a town, and that it is to the interest of the whole community that each dwelling should have good sanitary appliances, he concludes that local authorities should not stop at the function of inspection, but "should assume the function of inspecting and reconstructing house drains at the expense of the owner or occupier." It is not quite clear whether the consent of the owner or occupier is to be obtained or not. It is argued that "the work would then be executed upon a uniform system and under general contracts; the greater part of the work being nearly uniform in character would enable both the contractor and his workmen to become experienced in the details, and thus the work would be done better, cheaper and more systematically."

But Captain Galton goes further than this. He thinks that where private enterprise fails, the municipality should construct dwellings, and that the rents for these dwellings should be fixed on a scale to allow of their occupation by the very poor, and states that he advocates this, not at all as a philanthropic measure, but as a measure of sanitation, of economy, and of protection to the rest of the community. He says:

"We insist upon educating the children of the people, and we place the children during their school hours in airy, spacious rooms. But follow those children, who live in the more densly crowded parts of this city, to their homes in confined courts, without circulation of air; their playground in the court or street, often in the midst of refuse, and learning from the example of their parents, that the only comfortable place is the gin palace and the music-hall. It is not sufficient to content ourselves with giving education to this population; the education will be dangerous rather than beneficial if we allow the wretched dwellings which exist in so many parts of this metropolis to continue to exist. We have abolished the cesspools, which bred fever and intensified the plague of cholera; we must now abolish the wretched dwellings, which are moral cesspools, and which intensify moral disease by fostering crime and discontent. If the education which we now give so lavishly is to produce beneficial fruits, we must attend to the material comfort of the people as well as to their moral training. The provision of proper dwellings for the people is the natural complement of the measures which have been passed for the education of the people."

While we fully agree with Captain Galton as to the desirability of improving the habitations of the poor in our large cities, and also as to the necessity of perfecting systems of house drainage in order to keep the sewers free from offensive and dangerous matters, we have nevertheless grave doubts as to the expediency of the means which he proposes to secure these ends. How best to aid the poor without encouraging pauperism is one of the most difficult problems with which our modern civilization has to deal; but as municipal governments are now constituted, it seems certain that Captain Galton's plan would increase the very evils which he seeks to mitigate. As to the project of having a city contractor to do all the house plumbing in a city in accordance with orders to be given by official inspectors, who are under no obligations to regard the plans or wishes of the owners or occupants who are to pay the bills, it seems to us that the proposal carries its own condemnation.

Last week the mayor of this city sent to the Board of Aldermen a petition signed by some three thousand citizens, representing the wealth, public spirit and intelligence of the community, praying that the aldermen would reconsider their action in rejecting the nomination of Prof. Chas. F. Chandler for President of the Board of Health.

The petition set forth the importance of the nomination, on account of the extraordinary powers now intrusted to the Board of Health, and it declared that "the long and distinguished services of Prof. Chandler in the administration of sanitary laws, and his familiarity with all branches of sanitary science, conspicuously fit him for the position." This petition was returned to the mayor, and in such a manner, that it is evident that the Tammany members want no such man as Prof. Chandler in that position. If we were in the mayor's place we should send in Prof. Chandler's name each week that we held the office, or until confirmed, and allow these worthies to reject him, until they get tired of it. Unfortunately, however, the mayor is not disposed to take issue with these people, and we presume he will make another nomination. If a person in any way fit for the place is confirmed, it will be because the majority of the aldermen have been mistaken in the man. Our only hope is that they may be deceived.

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PLUMBING IN A NEW YORK COMMERCIAL BUILDING.

The system of waste pipe ventilation employed in the job described below is substantially the same as that illustrated in THE SANITARY ENGINEER of August 24, 1882 (Vol. VI., pages 250 and 251), but the location of the fixtures in the present case occasions some interesting arrangements not found in the other. The building is located at No. 47 Leonard street. Mr. T. M. Clark of Boston was the architect, and Messrs. E. Duggan & Co. of this city did the plumbing, under the direction of the owners.

All the fixtures are contained in a small toilet room in the front of the basement, under the steps between the building and the street. (The iron columns shown in the plan support a portion of the front wall.) The floor of this room is raised about two feet eight inches above the surrounding basement floor, on a platform of brick and concrete. The sides inclosing it are of a single thickness of boards, and the top is open to admit light through the steps, as shown in the perspective view. The traps and pipes connected with the urinals are exposed on the outer side of the wall on which they are placed, as indicated by dotted lines in the perspective.

The iron drain pipes shown in the plan are laid in concrete trenches, covered with brick. Beneath the water closets the earth was excavated to a depth of about three feet, and the space filled with loose stones, which directly underlie the closet traps, with nothing between, so that in case of a leak or overflow from the closets, the water may soak away in the earth. The traps are easily accessible from the outside of the room without tearing up the floor or removing the closets. The drain from them passes out from the platform above ground and enters a five-inch pipe, which extends to the rear for a rain leader (five-inch, trapped). An independent four-inch branch is taken to the roof for ventilation alone.

The closets are hoppers, flushed from one cistern by a seat attachment, which produces a preliminary as well as final flush. The urinals are flushed periodically by a tilting basin holding about one gallon, or one-half gallon for each urinal. The supply is adjusted to flush every three minutes. The floor and wall about the urinals are of white marble. There is no foot drain or outlet in the slab in the floor below the urinal, an arrangement which the plumbers of this job believe to be of greater harm than good—claiming that ordinarily so little water enters them that the trap is unsealed most of the time, allowing foul odors to enter the room from the drain. Instead of the usual bent lead connection between the urinal outlets and the waste pipe, requiring a long cutting through the slab, and a shield to hide it, these have nickel-plated brass, flange-and-thimble, bent couplings, requiring only a circular hole through the slab.

The peculiarity of ventilation here employed consists in the provisions for ventilating the fixture side as well as the drain side of the traps. This is accomplished by connecting the waste pipes just below the fixtures with a heated flue, consisting of a ten-inch galvanized iron pipe extending up through the roof and containing the exhaust steam pipe. As steam is used the year round for running elevators, pumps, etc., the flue is always heated. The connections to this flue are of the following sizes: from water closets, 2-inch; from urinals, 1¼-inch, and from basins, 1¼-inch. The trap vents are two-inch from closets and urinals, and 1½-inch from sink and basin, to a three-inch vertical pipe running separately to the roof.

On complaint of a citizen residing in the neighborhood, the Board of Health recently caused an examination to be made of public school No. 32, on 35th street between Eighth and Ninth avenues. The inspector reported the earthenware drain pipe broken and a consequent accumulation of stagnant water and filth in the cellar. The case was referred to the Board of Education.

STEAM FITTING AND STEAM HEATING.

BY "THERMUS."

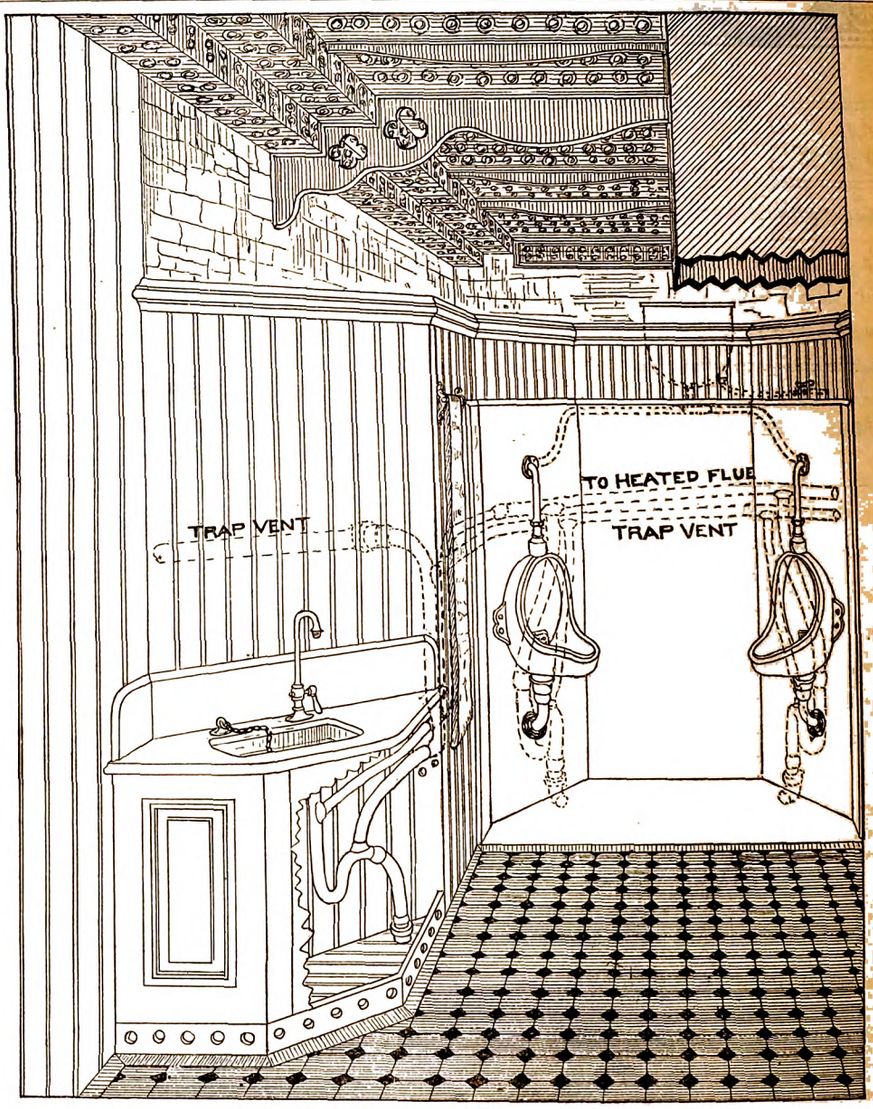
No. XXI.

FORMS OF RADIATORS.

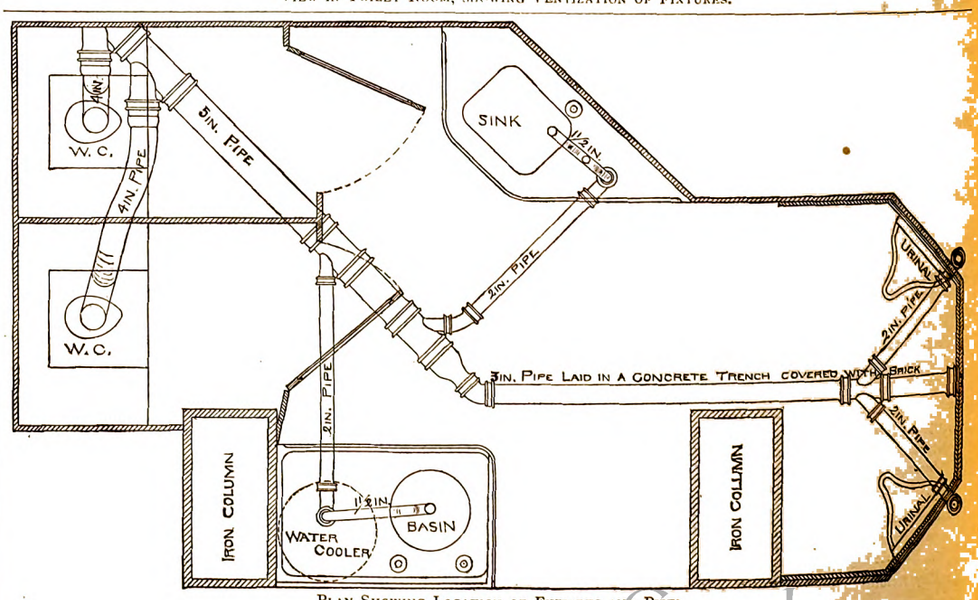
In the last paper my intention was to show that the nature of the metals composing heating surfaces had little or nothing to do with the amount of heat given off in ordinary warming practice, and that all metals from which heaters are ordinarily made, should be considered as equal, all other things being equal; but that every different form and modification had a value peculiar to itself, each of which may be expected to give a different result, all other things being equal.

The "flat coil," a coil for going against side walls, and composed of short lengths of horizontal pipe, connected at their ends by return bends, and doubling on themselves, one above the other, is the simplest and earliest form of radiator.

For convenience sake, and to suit the ordinary requirements of house furnishing, they seldom exceed four feet in length, and are increased



VIEW IN TOILET ROOM, SHOWING VENTILATION OF FIXTURES.



PLAN SHOWING LOCATION OF FIXTURES AND PIPES.

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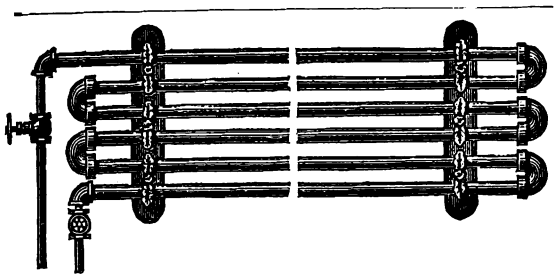
vertically to a great extent—20 to 24 pipes being sometimes used—to get the surface assumed or calculated to be sufficient.

In this form where there are many pipes—one over another—the under pipe is condensing the most water, because the air of the apartment comes in contact with it at a lower temperature than it can with any of the others, while at the same time the upper pipe is doing the least duty, because the air which reaches it comes to it warmed very highly, by being first in contact with the pipes which are lower down; and of all the intervening pipes, each has a different value, being greater near the bottom, lessening, in an undertermined ratio, with the upward progression. But should this coil be turned on its side instead of its edge—occupying a nearly horizontal plane—with each pipe slightly pitched in the direction of the flow of the steam, all the pipes will then have equal values as condensers, each condensing as much water as the lowest pipe did when against the wall.

Pipe in this form makes a good heater for direct radiation, but will not do so for indirect warming. Their comparative value is high, and when they do not exceed eight pipes in height,

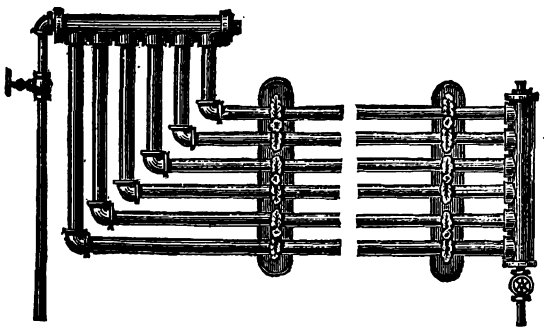


No. 1.

may be considered to have as great an efficiency for a square foot of surface as any of the present styles of radiators.

In making these coils for ordinary use the fitter cannot always follow his judgment, but has to make a coil which will fit the space which is allotted to him. Usually he is limited in length, but in height he is supposed to go to what is necessary to get the required surface; but this frequently makes an unsightly shaped heater, as well as one which, according to its surface, is not doing the duty which was expected from it.

It is better to limit the height to about eight pipes; say, let ten be the maximum, and increase the surface by placing two sections of the coil



No. 2.

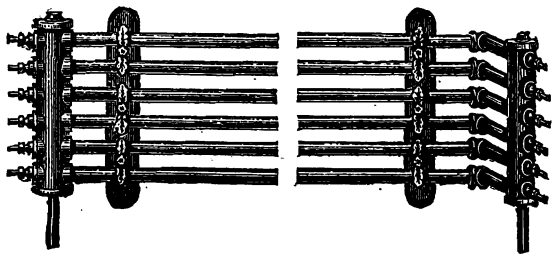
side by side, making what is called by the fitter a "two section coil."

In this form the two sections will not do double the work one section will do if placed alone, but the whole quantity of pipe in this shape will do more duty than if in the form of one high coil.

Three or more of these flat coils, placed side by side, and connected at the ends with "headers," or *manifold tees*, are called "box-coils"—presumably from their rectangular appearance, but more likely from the fact that they were formerly the principal style of indirect heater, which had to be boxed to make the heat available.

As a direct radiator without a screen, they were fair, but like the flat coil, gave the best result when the number of pipes in height was not great. Their mean efficiency was less than the flat coil for equal surfaces; but when placed at the side of a room and screened on the ends and outside, with a marble slab on top, their efficiency is low.

As an indirect radiator, they are fair, though the distance between the pipes is an objection to them with forced or exhausted ventilation. They give the best result when the air moves



No. 3.

over them at a velocity due solely to the rate of displacement caused by the heat they themselves communicate to the air.

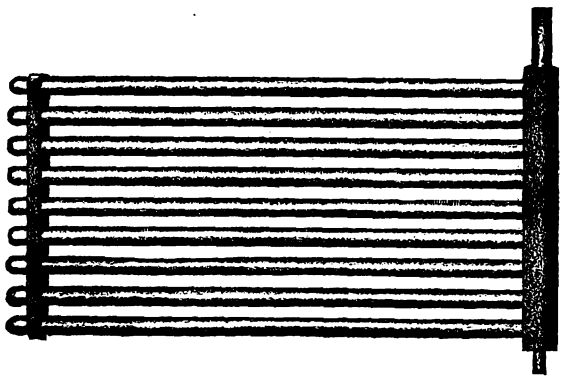
In low flat box coils, say 4 to 6 high, with forced currents, the air will pass through at comparatively low temperatures; but it must be borne in mind, that even should air be delivered at only 90° Fah., if sufficient of it is delivered to maintain the air of an apartment to say 72°, the result is, in a sanitary point of view, more salutary than when hot currents are admitted, which must be reduced in volume, to keep the temperature of the room within bearable limits—lengthening the time of the total change of the air.

With deep box coils (10 to 12) the air can be admitted sufficiently warm to suit ordinary conditions, giving a range of temperatures at the registers of from 110 to 130, varying with the pressure of the steam and the velocities of the air.

The box coil is fast becoming obsolete in consequence of improved heaters, which can be made at a much less cost per square foot of surface.

There are places yet, though, where it must be retained, noticeably where exhaust steam is used without much back pressure. For instance, when an engine is used for running a fan, the exhaust steam from the engine can be all used in a box coil, or a series of them in the mouth of the air duct just beyond the fan, in the direction the air is taking. This utilizes all the heat of the steam, which goes to the engine, and warms the air sufficiently to prevent freezing in the ducts further up, should water form in any of the piping, which could not run off.

The "wall coil"—a number of nearly horizontal pipes stretched along the walls of rooms, but connected at their ends by a "header" (instead of having return bends) with the pitch of all the pipes in the same direction—has a value equal to the flat coil for the same number of pipes in



No. 4.

height. The flat coil and the box coil may be looked upon as portable heaters, as by disconnecting them from the steam and return connections, they may be moved; but the wall coil is a fixture, and is built against the wall, usually following its contour and always turning some corners.

This style of coil is the best for an auxiliary heater for school houses.

When a school is warmed by indirect radiation for the purpose of insuring a positive change of air in a given time, it frequently happens that, though it may be considered very well ventilated, that it is not equably warmed; that the children sitting near windows or outside walls feel cold, though there are parts of the room which show comfortable temperatures.

In this case the coldest air is at the windows and along the outer walls, where it is continually falling; and though it may not feel uncomfortable for a few minutes, to remain in it will be very disagreeable, if not dangerous, if one has to remain for several hours at a time.

In this case about four pipes passed around the whole outside wall is usually sufficient to prevent the air from falling rapidly, and when it does come down, as it must in the natural course of the circulation to the registers, comes down more nearly alike in all parts of the room, the lower stratum (which is supposed to be the worst and certainly the coolest) being drawn off according to its gravity, and not having an outside stratum alternately hot and cold circulating around an inert centre.

Wall coils are sometimes made with manifold valve headers, or branch tees, and are admirable for the auxiliary school coils, as one pipe or any number of the pipes in a coil can be shut off separately from the others.

Another form of wall heater is what is known as a "trunion coil." Its efficiency is the same as the flat coil for the same number of pipes, and it is portable.

They are sometimes made with a return bend connecting each two pipes at their outer ends, and sometimes welded with a free end, with an inside circulating device.

Most of these coils can be made to appear very ornamental, as may be seen by the annexed illustrations.

No. 1 is the "flat coil;" No. 2 the "wall coil;" No. 3, a "wall-coil," with manifold valve headers, and No. 4 a trunion coil.

[To be Continued.]

MEXICAN HOUSES.

A correspondent of the London *Times*, writing from Mexico, says: "Springer, the capital of Colfax County, 716 miles from Kansas City, although surrounded by superior sandstone and some limestone rocks, at present consists of a few frame houses and some log shanties, interspersed with the true Mexican edifice, constructed of adobes, or bricks made of mud and water. The blocks, roughly cast in moulds, are usually about four times the size of an English brick, and are sun-dried. In this rainless climate these dried mud blocks are wonderfully durable; I have seen walls made of them 300 years ago still in good preservation. For the poorer class of Mexican dwelling, often about 16 feet by 12 feet, these adobes are placed usually singly, making a 10-inch to 12-inch wall, held together by a little mud mortar. At an elevation of 8 feet to 10 feet, fir poles or rough-sawn timber are laid from the front to the back walls, some of them projecting, without any regard to uniformity, two or three feet, and proving useful supports for suspending a pig, tools, drying clothes, or even the baby in its basket. The walls are carried about a foot above the roof timbers, on which are generally tacked rough boards, covered with a grouting of several inches of mud and gravel, from which rain is run off by a few wooden spouts or merely by holes left in the wall immediately over the rafters. Many of the older adobes are without a window, and the doorway, without the superfluity of a frame, is sometimes closed, as required, by a buffalo hide or other curtain. A fireplace is not always provided, cooking often being done in a small beehive-like oven, placed outside. The internal arrangements of such a dwelling—thousands of which are met with throughout New and Old Mexico—are of the simplest description. In many of the poorer houses in remote localities the beds, if such they can be called, are of hides (laid on the clean swept dirt floor), conveniently shaken and folded away when the occupants are astir. Many are still without either table or chair, for which a few rough stools are sometimes substituted."

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A SCHOOL HOUSE AND FEVER NEST.

We give below a description of a school house in Hoboken, as made by one of our staff, together with a letter from one of the school trustees. That such a condition of things is tolerated in a civilized community is a disgrace and crime. Yet it seems our correspondent fairly states the situation, when he says that this is a mere "pimple on the surface of a very diseased body," and this part of Hoboken seems to be that sort of a "body." Yet there can be no good reason why the school should not be closed until lots can be secured, where the privies and urinals can be located and maintained without offense to the inmates of the class rooms, nor is there any reason why urinals cannot be flushed during school hours and contents of vaults removed every day.

It strikes us that here is a practical problem for the State Board of Health to tackle. At any rate with their support, it may be those who cannot thrive on stenches can succeed in reclaiming this vast cesspool, meanwhile the Priest and Beer Interest would seem to be good subjects for sanitary missionary effort.

That school house No. 3, in Hoboken, is in an eminently unsanitary condition, is an obvious fact. For, besides having a water closet that is nothing but a huge latrine between the wings of the building and immediately beneath the windows of several of the class rooms, it is also situated upon a marsh that receives the contents of two sewers. Adjoining the school house is a sluice gate that intercepts the sewer water and that of the marsh. At high tide this sluice is opened and allows the refuse in the sewer to be flushed into the marsh. At low tide all this sewage is supposed to flow out with the retiring waters.

But, in truth, a part of the in-washed sewage remains in the marsh. The sluice, then, is nothing but a flush gate that allows the sewer to be flushed alternately in and out of the marsh as the tide rises and lowers. At a distance of four blocks behind the school house another sewer empties into the marsh. It is termed the "Ravine Road" sewer. Some time ago it was broken at a point close to the marsh, and its contents were allowed to flow into it. In summer it is said that the odors in this vicinity are something appalling. The mere sight of the place bears witness to this statement. These facts constitute the evils of the marsh. The water closet, as stated, is but a huge vault, receiving all the refuse of the school, and is emptied every three days. It is divided into two sections, one for the boys, the other for the girls. In both there are two rows of seats, containing eight each, together with a private closet for the accommodation of the principal and teachers. In one corner of the vault is a trap and gate. The gate, which works on a lever, can be closely pressed against the mouth of the trap at will. In the boys' department there is a long iron trough urinal. No water runs into this, and its bottom leaks; the ground around it is consequently saturated with urine and emits a stench. The water closets, urinal and the marsh are not the only causes of complaint, though indirectly they contribute to the other evils. To keep the exterior stenches from penetrating within the building, the windows and doors are sedulously closed, and the inmates seem insensible to the vile atmosphere which accumulates in the class-rooms. The results are indicated by the fact, as we are informed, that many of the scholars are constantly ill and on an average three out of twenty teachers are on the sick list.

The following is the School Committees' last report:

"No change in the sanitary condition of this school has been made since last year's report. The three rooms reported as being badly located and illy ventilated are still used as class rooms, though every day spent in them during the warm weather must seriously affect the health of both the teachers and the scholars. The suggestion of the Board for the removal or remedying of this evil was partly carried out, by appropriating $1,800 for the purchase of the lots in the rear of the building. This sum not being sufficient, the purchase was not made. It is absolutely necessary that these lots be secured before tenement houses, with their numerous water closets, are erected thereon, thereby adding more poison to the already surcharged atmosphere, beside shutting out the light from rooms that are already too dark. The repairs, with the exception of kalsomining, will not be many, and those only trifling; some patching of plastering, a few windows and shutters, door-knobs, and the re-setting of a few patches of brick in the yard. Owing to the crowded condition of the three lowest classes, it was deemed expedient to divide them into sections, one to attend during the forenoon, and the other in the afternoon. Even with this arrangement, all of the children who have applied for admission cannot be accommodated, proving the necessity for the erection of a new school building as soon as possible. The building is heated by stoves, and is kept clean and in good order by a janitress."

To the Editor of THE SANITARY ENGINEER:

I was informed this morning by Mr. Kelly, principal of School No. 3, located on Adams street, Hoboken, N. J., that your reporter was over inspecting as to the situation at that school. There is much to be complained of in relation to sanitary matters in that section, and necessarily a good deal about a large school situated in a neighborhood like that where sanitary arrangements are so bad. I am one of the school trustees and have lived ten years in the same vicinity. I removed four years ago from there to a good situation in the up-town part of the city. I state freely that I was *stunk out.* I discharged my whole duty while there in trying to have a good system of sewerage adopted, and worked up to as far as practicable. I was appointed on a legislative commission to carry out a system of sewerage. Our commission—composed of clear-headed business men, including W. W. Shippen, President of the Hoboken Land and Improvement Company—set to work by first employing Levi D. Post, a Hudson County engineer, now of Atlanta, Ga., to make a survey and plan. Mr. Post did this in a very careful manner. In order that there might be no mistake, our commission called in Mr. Kirkwood, of Brooklyn, the most eminent in his profession we could think of. Mr. Kirkwood and Mr. Post went over the matter together. The former approved the latter's plan, with some alteration relating to further sinking the pumping station, so as to increase the grade of the sewers running into it.

The plan will be substantially understood by the referring to the inclosed map, which was made for another purpose, but upon which I have traced red lines to show the plan of sewerage. This plan covers that part of the meadows south of Eighth street. From Eighth street to the northerly end, at Weehawken, a similar plan was contemplated, but on account of that part being in its primitive wildness, and not yet used for building purposes, we concluded to defer that work for the then present.

We went so far as to have a contract given out for the main sewer in First street; also for the pumping basin and tail sewer. The property owners (some of them) raised a clamor, that we intended to rob them and destroy the foundations of their houses. They went to court and had our commission "knocked out" on a technicality. That ended that. I never had any pay for my work, neither had any of the other commissioners, except the secretary, who did some superintending, etc.

A few years afterward, some public spirited citizens stirred the matter up again, thinking that the general health was eminently endangered by this "slough of despond." Spiellmann & Brush—a firm of very clever engineers, located in Hoboken—were made interested and took a great deal of trouble surveying, calculating, etc. It was the old story. The people of the neighborhood got up meetings and raised an outcry, that there was a conspiracy to rob them, that their foundations would be all rotted, etc. And even the priest (I think it was Father Corrigan, still in Hoboken) raised a protest that the piles under the Catholic Church would be rotted, and the devil would be to pay generally. That settled it. Now we have the periodical howl about stinks, etc., around the school house.

The fact of the matter is, that the whole neighborhood stinks; there is practically no sewerage. The fluids from the privies all over the meadows permeate the filling, which is principally cinders from furnaces in New York City. Scratch into the ground anywhere for a few inches and you find a sickening, inky-looking fluid. Over this the same people who always defeat sewerage live, move and have their being! How they live, God only knows! I don't.

At last vacation we (the School Trustees) had the old school water closets torn out and had the best arrangement possible constructed. There was a foundation of plank laid on the flat down in the mud. The mason built up walls of the best brick and cement. It was a long trench under the seats like a bath-tub. It had a gate at one end which was worked by a lever; during the day the basin was filled with water. After school hours the gate was opened and all contained in the basin was put in the flood. It was in addition washed with a hose. Before the same order at present. All school privies small. Several years ago we asked the Council to purchase lots in the rear, so that the privies could be removed back from the school yard. They are now at the rear of the school yard. The Tax Commissioners appropriated $1,800 to buy the three lots. This was a fair price. The man who owned them, a wealthy citizen in the vicinity, saw his advantage, and refused to sell for less than $1,000 each. The Council would not submit to the extortion, and so the matter stands.

It is, of course, always a pity to see any people overwhelmed with stench and filth. It is their own fault. They say, "Let us alone and we will fill up." They have been let alone and they don't fill up. Here and there some one does fill up; this only increases the difficulty, as that filling acts as a dam against the outflow of stinking fluid.

We have a pair of engineers in Hoboken who are responsible for most of the mischief. All engineers of any standing or reputation favored the pumping system as the only solution of the difficulty. When Spiellmann & Brush, a rival firm, were working on their plans, the former firm was going round among the people making them believe that sewers without a fall or grade (no other can be had with the present legal grade) were good enough. They even offered to build them. I presume they didn't care much whether they worked or not, so long the job was theirs. They did not get the job. The whole thing has been abandoned, and remains at present in what the lawyers call *statu quo.* Attention is just now called to it by this school house howl. If it shows them and those in charge of the piles at Saint Mary's Church the necessity of a determined move of some kind, I say all right. We school trustees have done our whole duty in the matter. We are determined that none of the responsibility shall rest with us.

I have inclosed a publication which came out during one of the excitements about sewerage. It will explain the sanitary situation and the various plans. It is the only thing I could lay my hand upon which would post you up. This school house business now spoken of is a mere pimple on the surface of a very diseased body. Cauterizing the pimple won't serve. The remedy must be radical and far-reaching.

The above are all facts. For further information I would refer you to Spiellmann & Brush, engineers, at No. 13 Newark street, Hoboken. If you desire to investigate intelligently, they can post you up.

I don't desire my name to be running through the prints. I only wanted to set you on the right track as to investigation. Yours, etc.,

ONE OF THE TRUSTEES.

Hoboken, May 18, 1883.

The Washington *Star* prints a very interesting account of the library of the Surgeon-General's office of the United States Army, obtained from a conversation of one of their reporters with the librarian, Dr. J. S. Billings. This now famous collection of books had its origin in a small collection in the office of the Surgeon-General, which was probably commenced by Surgeon General Loball, about 1830. At the beginning of the late war this collection consisted of about 350 volumes, mostly medical text books and journals. In 1862 and 1863, while Dr. Hammond was Surgeon-General, about 360 volumes were added, being chiefly works relating to military medicine and surgery. A catalogue published in the fall of 1865 shows that the library then contained about 1,800 volumes. The catalogue of 1872 placed the number of volumes at 13,000, which chiefly related to military hygiene, medicine and surgery, to public hygiene and medical statistics. In 1874 there were 25,000 volumes and 15,000 single pamphlets catalogued, and since that date the growth has been uninterrupted and progressive, and at the present time the library contains 60,000 volumes and 66,000 pamphlets. Authorities now regard the library a better practical reference and working collection for medical purposes than the great library in the British Museum, or the Bibliotheque Nationale in Paris. Dr. Billings's assistants are Dr. Robert Fletcher and Dr. H. C. Yarrow.

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
May 19.....	26.28	19.76	22.77	27 95	29 09	19.58

E. G. LOVE, Ph.D., *Gas Examiner.*

THE RECUPERATIVE GAS LAMP.

Among the gas exhibits in the south nave of the Crystal Palace is a lamp which is worthy of notice as giving a good light with what is stated to be a very moderate consumption of gas, and which is self-ventilating. This is the recuperative gas lamp of Mr. Frank W. Clark, of 47 Millbank street, Westminster. Fig. 1 of our engravings is an external view of this lamp as fitted against the

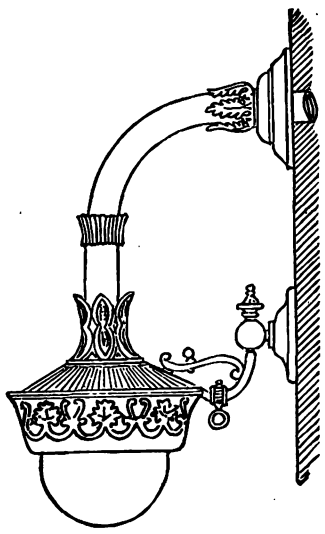

FIG 1.

wall for interior illumination, Fig. 2 being an enlarged vertical section. The lamp body is fitted with a semi-globular glass *b*, and contains the concentric tubes *d*, *d*,' *e*, and *e*'. The connection between the outer tube and the lamp body is made with the reflector plate *g*. The structure of the upper chamber between the cover *c*, and the reflector is clearly shown. The gas supply pipe *t*, is fitted at one side of the lamp at *r* and is led into the chimney and descends in the centre to the burner *v*. The air for maintaining combustion enters in the first place through holes in the lamp body at *k*, and passes upward between the tube *d* and an outer screen to the cross tubes, whence it decends in the interior of the pipe *d* to the burner. The products of combustion rise between the tubes *d* and *d*',

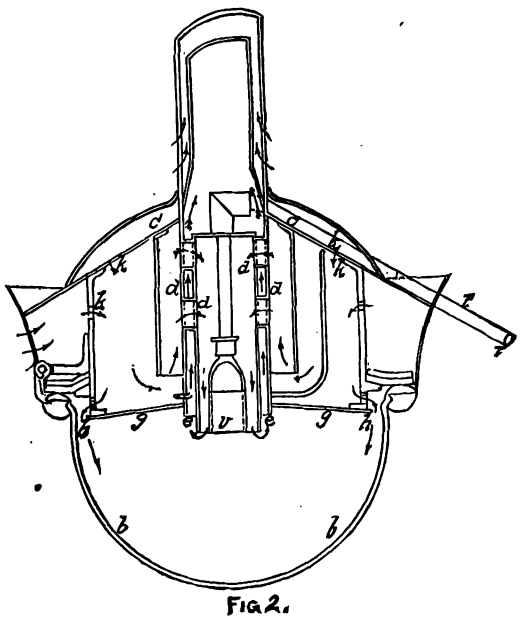

FIG 2.

and in their exit part with some of their heat to the entering air, retaining sufficient warmth, however, to keep up a draught in the chimney, and carry off the water of combustion. Air can be admitted at *h*, between the reflector and the glass, to keep the latter cool if required. The ventilating tube is attached to the top of the lanterns when they are fitted up as brackets or side lights, as in Fig. 1; but when the lanterns are fixed in the roof of a building the ventilating tube is constructed in the same way as in the ordinary sun burners By this arrangement a system of ventilation is insured, as the vitiated atmosphere in the room passes through the lantern into the ventilating tube. The lanterns intended to be used for street lighting, railway stations, etc., do not require ventilating tubes. They can also be fitted to railway carriages which are supplied with gas either at a high or low pressure. Mr. Clark has constucted a number of lamps on this principle, and their working is stated to be perfectly satisfactory. It, of course, gives a shadowless light, which is a point of considerable advantage. Mr. Clark's aim has been mainly to produce a cheap and practicable lamp adapted for railway, street and indoor use, and in this he appears to have succeeded. Should the consumption of gas prove to be economical in regard to the light produced, there would seem to be a good future for the recuperative lamp.—*Iron.*

ELECTRIC LIGHT NOTES.

Reading, Pa., will be lighted by electricity by the first of June.

Electric lighting was introduced into Harrisburg Pa., on the night of May 14.

The Brush Electric Light Company are engaged in erecting towers for lighting Eau Claire, Wis.

Gas is be abolished from the Savoy Theatre in the entrance, corridors and offices, which will be lit with Swan lamps.

There will be a pavilion at the Electrical Exhibition in Vienna, designed to show the effect of the electric light on cloths and embroideries.

The Board room of the Stock Exchange is illuminated with the Edison electric light. Three chandeliers, of sixty-six lamps each, are suspended from the ceiling.

A committee has been appointed in England by the Board of Trade to determine the relative merits of oil, gas and electricity as light-house illuminants.

The Grand Trunk Railway shops at Montreal were lighted on the 12th ult. by arc lamps of the Craig system, devised by J. A. I. Craig, furniture manufacturer in that city.

The total number of electric lamps installed in England up to April 6, was 8,443, of which 4,463 belonged to the Edison Company of London, and 3,980 to the Manchester Company.

The owners of the Guion Line steamship "Oregon," now building at Glasgow, have contracted with the Edison Company for 500 H (6 c.p.) lamps. The vessel is to be fitted throughout with the electric light.

The library and dining room of the House of Commons is lighted by 265 Edison lamps. The Armington and Sims' engines, which furnish power, derive steam from the boilers of the ventilation works.

The Egerton Woolen Mills at Umritsar in the Punjaub are lit with Brush lamps. The power to run the dymamos is derived from the irrigation canals. The cost of each of the sixteen lights is sixteen shillings (about $4) per month.

The committee of the Brooklyn Aldermen, to whom the petitions were referred for permission to erect poles for electric lights in the streets, will report in favor of granting permission to the Fuller Electrical and the United States Illuminating Companies.

A committee appointed at a recent meeting of Councils of Philadelphia, and conststing of Messrs. Patton, Banes, Cuming, Smith and Hoffman, will proceed to Chicago this week for the purpose of inspecting a test of the American Sectional Underground Company's system.

The petition of the Hartford Elecric Light Company for leave to erect poles in the streets of Hartford, on which to carry their wires, was opposed for the reason that the erection of poles by the electric light, telephone and other companies was a nuisance and an unnecessary evil.

Philadelphia has just entered suit against the Bell Telephone Co., for $2,095.50, the amount of taxes said to be due on the wires stretched above the housetops in the city. The company claims that there is no tax imposed on those wires run over the house tops, but admits the legality of taxing those attached to the poles.

Sixty-four of the 70 electric lamps, which will illuminate the Brooklyn Bridge were lit Saturday evening. The current was derived from the central station of the United States Electric Lighting Company, which has the contract for lighting the bridge, but eventually a special plant will be established at the Brooklyn end of the Bridge.

The general Committee on Underground Communication have prepared and are issuing circulars requesting information or plans for underground electrical conduits, etc., to be submitted to the sub-committee on electrical and mechanical devices for their examination. Communications should be addressed to W. C. Behrens, 115 Broadway.

An electrical apparatus has been invented for the purpose of catching fish. It consists of three Edison electric lights, enclosed in a hermetically sealed glass case, which is surrounded by a glass globe, and capable of resisting the pressure of the water at a great depth. The light is turned on beneath the sea, and a net placed below the light will be drawn at the proper time.

Among the exhibitors at the Cincinnati Exposition, which takes place this fall, will be the United States Electric Light Company, the Brush Swan-Light Company, Excelsior Light Company, Edison Light Company, the Fuller Light Company, the Faure Storage and Light Company, storage batteries. The United States Light-house Board will display a range light and flash lights, with lamps, clockwork, etc.

We take these notes on the progress of the Light house Board, in the application of electric lights to light-houses, from an interview with President Henry Morton, reported in the *Sun*:

"Plans for testing the lighting of light-houses by electricity are nearly completed, and the test will be had at the entrance to the lower harbor, probably at one of the two Highland lights. In both France and England many light-houses have electric lights, but America has none. The test, he said, would demonstrate the success, or failure of electricity in light-houses in America. He believed that electricity (arc lights) would not be found to be serviceable for coast and harbor illumination, mainly because it wavers in intensity. The lights in American light-houses are so arranged as to throw regularly intermittent flashes to the navigator, and if the electric light should die down it would show a series of irregular flashes, and that might be very confusing.

"Prof. Morton has been carrying on a series of experiments with incandescent lights, with a view to reach the greatest possible light. He has succeeded in obtaining 400 candle power. This, Prof. Morton says, is really much brighter than one of the ordinary street arc lights. An incandescent light has thus been obtained powerful enough to conduct the experiment with.

"Two items of considerable expense remain. The great lenses used for the lamps now in the light-houses, it is found, serve to dissipate instead of to concentrate the rays of an electric light, so that lenses must be ground especially for the electric light. Two dynamo machines also must be at the foot of the light-house, one to be kept in reserve if the other should fail."

Meter-ites.

The trustees of the Gas Works, Philadelphia, have elected Alex. J. McCleary to fill the newly-made office of Controller of the Trust. They re-elected the Cashier, S. White; Superintendent Parks to serve for one year.

The Charleston, S. C., Gas Company announce a reduction in the price of gas from $2.75 to $2.50 per thousand feet in cases where gas is used for illuminating purposes, and from $2.25 to $2 per thousand where it is used for stoves and for engines.

May 10, a gas stove exploded in the baggage car of a regular passenger train on a Western road last week. There was no means of extinguishing the fire on the train, and it had to be allowed to burn itself out, thus delaying the train nearly four hours. The car, mail and express matter were all consumed.

The Commissioner of the Department of City Works of Brooklyn, has been directed by the Common Council to cause the gas furnished to the city to be examined as to its illuminating power, in not less than fifteen different parts of the city, and transmit to the Board at its next meeting the result of the testing.

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AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.*

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

(Continued from page 508.)

Circulation of Steam for Warming.—There are two methods of warming with steam, one with live steam direct from the boiler, and the other with exhaust steam. These two are frequently carried out in combination, and in fact generally so where exhaust steam is used at all for warming. The circulation or distribution of the steam through the warming pipes is effected in an almost unlimited variety of ways, each possessing advantages for special cases. The cause producing the circulation throughout the pipes of the warming apparatus is solely the difference of pressure which results from the more or less rapid condensation of the steam in contact with the radiating surfaces; a partial vacuum of greater or less amount is thereby formed within the radiating portions of the apparatus, and the column of steam or of water equivalent to this diminution of pressure constitutes the effective head producing the flow of steam from the boiler, while the return current of condensed water is determined by the downward inclination of the pipes for the return course.

When using live steam direct from the boiler, the system of what is called close circulation is carried out, either with separate supply and return mains, both of which extend to the furthest distance to which the heat has to be distributed; or else with a single main, which answers at once for both the supply and the return, either with or without a longitudinal partition inside it for separating the outward current of steam supply from the return current of condensed water. In what is called the system of open circulation, a supply main conveys the steam to the radiating surfaces, whence a return main conducts the condensed water, either into an open tank for feeding the boiler, or into a drain to run to waste, the boiler being then fed from some other source; in either case suitable traps have to be provided on the return main, for preserving the steam pressure within the supply main and radiators. These two systems, in any of their modifications, may also be combined, as is most generally done in any extensive warming apparatus.

In connection with closed circulation, the exceptional character of the single-main distribution calls for some further remarks. The employment of a single main for both supply and return is restricted to buildings where the horizontal distances through which the heat has to be distributed are very short, but where the vertical distances are relatively great. These conditions occur more particularly when the warming is extended to several stories, as in single dwellings or office buildings covering little ground.

There are three principal methods of single main distribution. In the first, the main is devoid of any internal partition, and is carried up from the boiler at once to the highest point, without taking off from it on the way any distributing branches, all of which are led off from it afterward in its descending course. Wherever in the ascending course, before the highest point is reached, it has to take an inclined instead of a vertical direction, it must rise at an inclination of not less than 1 in 30 to the horizontal, in order to let the condensed water run back in spite of the current of steam passing in the contrary direction. To insure the size being large enough, the diameter for a vertical main should be taken at least equal to that furnished by tables VII. to X. in the appendix; but for an inclined main (rising 1 in 30) the diameter should be doubled. This first method, however, is much embarrassed by the air which gets entrapped within blind branches that offer no thoroughfare; the radiators are, consequently, not certain of getting heated, and the apparatus is apt to be noisy for the reasons subsequently explained.

The second method applies to distributions extending through considerable distances horizontally. Here it is more satisfactory to start with a primary circulation through separate inclined supply and return mains, in place of a single main, however large or however steep; and to relegate the single-pipe system to a secondary rank, employing it for vertical branches led off from the primary supply main. The course of the primary supply main is a descent with proper slope to the remotest horizontal distance; and, immediately underneath each single pipe branch rising vertically from it, a receptacle is provided in the primary main, large enough to catch all the condensed water returned from the branch; these receptacles are themselves drained back to the boiler by the return main. From the vertical single-pipe branches, short single offshoots are led off laterally to the radiators in the rooms of the different stories. The air difficulty is avoided with much success, by carrying each vertical branch first to the highest point required, free from all lateral offshoots; and supplying the several radiators from its descending or return course, by connections so arranged as to preclude lodgment of air.

In the third method of single-main distribution, which is possibly as satisfactory as either of the two preceding, a single upright pipe is employed, having a hoop-iron partition tightly inserted for separating the ascending from the descending current. Such a pipe need be no larger than prescribed by tables VII. to X. in the appendix.

The system of closed circulation requires the boiler to be placed so low as will allow all the return pipes to drain freely back to it above its water-level. This condition has been modified mechanically by the automatic "Albany trap," a device frequently employed for lifting from a lower level part or all of the condensed water, and delivering it into the boiler; it is in fact a displacement pump. The same result has been attained by draining into a closed tank, placed low enough to accommodate all the return pipes, and made strong enough to stand the full boiler pressure with safety; and then employing a steam-pump, either reciprocating or centrifugal, to raise the water from this tank to the proper level for enabling it to flow back into the boiler, the whole of the circulation being closed from communication with the atmosphere.

Steam mains and branches are apt to be noisy whenever any dipping bend or pocket in the pipes, or any recess in the fittings, allows water to accumulate, and to become cooled below the temperature of the steam supply. In such cases a rapid condensation occurs there, and the steam rushing in carries the water along with it; or sometimes two opposing currents of steam, rushing into the vacuum, meet each other, and characteristic noises of rattling and hammering are produced.

Where separate supply and return pipes are used, whether the system of circulation be open or closed, they should everywhere slope downward in the direction of the current of steam or of water. A fall of ½ inch in 10 feet (1 in 240) has been found ample to provide against all sag of the pipes or other mechanical defects in the work, and to insure silent working. When the levels at which the radiators have to be placed do not admit of this slope being continued in the so-called horizontal supply main, vertical breaks are made in the line by the insertion of pipes of larger diameter, which are trapped by check-valves or syphons into the return main. In any extended distribution by separate supply and return mains, the supply main should be connected to the return at the remote ends by the method of open circulation; and between any parallel or not very distant supply and return pipes, occasional drips should be provided, at intervals of say 600 to 1,200 times the pipe diameter, syphoned off to prevent any short circuit. Branches upon the horizontal mains, whether supply or return, should be connected upon the top of the main, not at the sides or bottom. Freedom for expansion should be allowed by horse-shoe or S bends, or when practicable by elbows judiciously arranged. Expansion joints are an established fitting for warming apparatus; but their use is not to be approved except in emergency. Repairs are facilitated by substituting at frequent intervals along the mains, in place of some of the screw couplings, cast-iron flange joints, the flanges being screwed upon the tube ends. Main pipes should in all cases be either carried on rollers or suspended, to allow freedom for expansion without straining the joints. The author does not attempt to describe completely all the minutiæ of detail in the construction of the mains for warming by steam; but simply notices some of the appliances commonly employed in America, which have been devised and worked out practically, and are regularly manufactured for general use.

Clothing of Steam Mains.—To prevent loss of heat, steam mains are protected by clothing, as described by Rumford in the last century. Felt is found to perish when applied direct to a surface as hot as 200° Fahrenheit; and Rumford's air-space, formed by inclosing the main within a rather larger casing of thin cast-iron, or, of sheet-iron either plain or tinned or zinced, is sufficient for enabling the felt to be employed as the clothing outside the casing. A covering of wire-netting has also been devised. Coats of porous terra cotta or of porous plaster answer, by their low conductivity, to save the felting, put outside them. Outside the felt again is applied some suitable sheathing protecting covering that will stand the exposure. When thus clad, the loss incurred in carrying a steam main to any distance—either out of doors, or inside rooms, in passages, in cellars, or in culverts or flues either underground or above—is found to be less than 1 unit of heat for each 100 square feet of external surface of the main itself. The ratio which this loss bears to the total quantity of heat transmitted is exemplified for particular cases in table XII. in the appendix.

* A paper read before the Institution of Civil Engineers, November 28, 1882.

TABLE VII.

Internal Diameters of Steam Supply Mains, with total resistance equal to 2 inches of water column.

Steam, Pressure 10 lbs. per sq. in. above atm. Temperature 239° Fahr.

Formula, $d = 0{\cdot}5374 \sqrt[5]{\frac{Q^2 l}{h}}$ where d = internal diameter in inches;

Q = 9·2 cubic feet of steam per minute per 100 sq. ft. of radiating surface;

l = length of mains in feet; h = 159.3 feet head of steam to produce flow.

Radiating Surface.	Internal diameter in in. for lengths of Mains from 1 ft. to 600 ft.										
	1 ft.	10 ft.	20 ft.	40 ft.	60 ft.	80 ft.	100 ft	200 ft	300 ft	400 ft	600 ft
Sq. ft	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
1	0.075	0 119	0.136	0.157	0.170	0.180	0.189	0.216	0.234	0.248	[illegible]
10	0.19	0.30	0.34	0.39	0 43	0.45	0.47	0.54	0.59	0.62	[illegible]
20	0.25	0.39	0.45	0.52	0 56	0.60	0.62	0.72	0.78	0.82	[illegible]
40	0 33	0.52	0 60	0.69	0.74	0.79	0.82	0.95	1.03	1.09	[illegible]
60	0.39	0.61	0 71	0.81	0.87	0.93	0 97	1.11	1.21	1.28	[illegible]
80	0.43	0.68	0 79	0 90	0.98	1.04	1.09	1.25	1 35	1.43	[illegible]
100	0.47	0.75	0.86	0 99	1.07	1.14	1.19	1.36	1.48	1.57	[illegible]
200	0.62	0.99	1.14	1.30	1.41	1.50	1.57	1.80	1 95	2.07	[illegible]
300	0.73	1.16	1.34	1.53	1.66	1 76	1.84	2.12	2.30	2.43	[illegible]
400	0.82	1.30	1.50	1.72	1.86	1.98	2.07	2.37	2.57	2.73	[illegible]
500	0.90	1.43	1.64	1.88	2.04	2.16	2.26	2 60	2 81	2.98	[illegible]
600	0.97	1.53	1.76	2.03	2.20	2.33	2.43	2.79	3.03	3.21	[illegible]
800	1.09	1.72	1.98	2.27	2 46	2.61	2 73	3.13	3.40	3.60	[illegible]
1,000	1.19	1.88	2 16	2.48	2.69	2.85	2.98	3.43	3 71	3.94	[illegible]
1,200	1.28	2 04	2.33	2.67	2.90	3.07	3.21	3.68	4.00	4.23	[illegible]
1,400	1.36	2.15	2.47	2 84	3.08	3.26	3.41	3.92	4.25	4.50	[illegible]
1,600	1.43	2 27	2 61	3.00	3.25	3.41	3.60	4 13	4.49	4.75	[illegible]
1,800	1.50	2.38	2.74	3.14	3.41	3.61	3.78	4.34	4.70	4.98	[illegible]
2,000	1.57	2.48	2.85	3.28	3 55	3 76	3 93	4.52	4 90	5 19	[illegible]
3,000	1.84	2.92	3.36	3.85	4.18	4.43	4.63	5.32	5.77	6.11	[illegible]
4,000	2 07	3.28	3.76	4.32	4.69	4.96	5 19	5.96	6 47	6.85	[illegible]

For other resistances and pressures, multiply by the respective factors below:

Water col.	6 ins.	12 ins.	24 ins.	[illegible]
Mult. by	0.8027	0.6988	0.5888	[illegible]
Press. above at.	0 lbs.	3 lbs.	30 lbs.	60 lbs.
Multiply by	1.023	1.015	0.973	0.948

TABLE XII.

Reduction in Area of Radiating Surface, to compensate for loss of heat from surface of steam supply mains.

A	B	C	D	E	F	G	H	J	K	L
Assumed Length l of steam main.	Assumed area of Radiating Surface.	Corresponding Inside Diameter of steam main.	Nearest Nominal Inside Diameter of wrought-iron Tubes.	Assumed Number of Elbows.	Length of main equivalent to E elbows and one inlet and one valve.	Corrected Length $(=A-F)$ for main of nominal size D.	Area of outside surface of main for length G and size D.	Radiating Surface equivalent to H $(=\frac{H}{3})$ when main is properly clothed.	Corrected Area of Radiating Surface $(=B-J)$.	Joint Cost of Supply and Return Mains, in Percentage of Cost of Radiators $(=\frac{300 \times K}{B})$.
Ft.	Sq. ft.	In.	In.	No.	Ft.	Ft.	Sq. ft	Sq. ft.	Sq. ft.	Pr. ct.
40	60	0 49	½	4	15	25	6	2	58	31
40	100	0.60	¾	4	15	25	6	2	98	18
40	200	0.79	¾	3	16	24	7	2	198	11
40	500	1.15	1¼	1	18	22	10	3	497	6
40	1000	1.51	1½	1	22	18	9	3	997	3
40	2000	2.00	2							
40	4000	2.63	3							
100	60	0.59	½	13	34	66	15	5	55	82
100	100	0.73	¾	8	30	70	19	6	94	61
100	200	0.96	1	6	31	69	24	8	192	37
100	500	1.38	1¼	4	32	68	30	10	490	18
100	1000	1.82	2	2	34	66	41	14	986	12
100	2000	2.40	2½	2	41	59	45	15	1985	7
100	4000	3.16	3½	1	47	53	56	19	3981	4
200	60	0.68	¾	18	57	143	89	13	47	249
200	100	0 83	¾	18	57	143	39	13	87	134
200	200	1.10	1¼	10	60	140	61	20	180	102
200	500	1.59	1½	8	59	141	70	23	477	44
200	1000	2.09	2	6	62	138	86	29	971	27
200	2000	2.76	3	4	71	129	118	39	1961	18
200	4000	3.64	4	2	67	133	157	52	3948	12
600	60	0 85	¾	20	62	538	148	49	11	4296
600	100	1.04	1	20	80	520	179	60	40	1343
600	200	1.36	1¼	20	106	494	215	72	128	504
600	500	1.97	2	20	159	441	274	91	409	201
600	1000	2.60	3	14	173	427	393	130	870	135
600	2000	3.44	3½	12	177	423	443	148	1852	45
600	4000	4.53	4½	9	180	420	549	183	3817	19

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[1]*E*.—The elbows are assumed to occur at intervals of not less than 120 times the nominal inside diameter *D* in the corrected length of main *G*, and never to exceed twenty in number.

[2]*L*.—The outside surface of the water return mains, which are of the same length as the steam supply mains, is assumed to be only one-half that of the steam mains; and the cost per square foot of either surface is taken at double the cost per square foot of the radiating surface.

Correspondence.

PROF. BAUMEISTER'S PAPER ON SEPARATE SEWERAGE.

To the Editor of THE SANITARY ENGINEER:

Criticism, *ex cathedra*, is always interesting and generally instructive. Prof. Baumeister's paper (of which a translation appeared in the May 3d number of THE SANITARY ENGINEER) indicates a careful review and consideration of the whole question. With many of his arguments I am in full accord. There are some points, however, in which he seems to be mistaken, and these are points upon which his general conclusions are largely dependent.

I think he puts the difference between the area of the flow of combined and separate sewers at too low a figure. With a separation of all storm water, it is usually considered that in this country the difference is as one to fifty instead of one to thirty. He says that the beginning of decomposition may be of little importance when a good ventilation of the sewers is provided. He thinks that with the egg-shaped section of sewer we may get the same advantage of small invert radius that we have with small pipes. He thinks that "the whole comparison" is reduced to the amount of flushing water required in the two different systems. He fully agrees with what I have long believed as to the disadvantage of admitting street dirt into the sewer, and to overcome this disadvantage an enormous amount of flushing water would be required. He says that a disadvantage revealed itself in the Memphis work through the introduction of obstructing objects which would not have obstructed larger sewers. He seems to find fault with the digging up of the streets that has been required to remove obstructions in Memphis. He says that, "according to our ideas," dirt should not be allowed to accumulate in a gulley so that it would not be efficiently covered with water.

The most important point to which I would call attention is Prof. Baumeister's statement that with equal openings the ventilation of large sewers is more efficient than that of small sewers. This statement he emphasizes and sets forth so distinctly that it may almost be called the turning point of his argument.

Basing his opinion largely on the statements to which I have referred, he concludes, that the decision between the separate and combined systems is not to be decided on the ground of "sanitary advantage," but rather on financial considerations.

It seems to me that Prof. Baumeister is wrong in several small points, and very wrong in his most important one. The decomposition of organic matter in sewers cannot be regarded, however well they may be ventilated, as a matter of little importance. The use of egg-shaped sewers with a small invert, while it may secure the removal of ordinary house wastes without difficulty, provides, as Mr. Gardiner clearly showed, an almost ideal hotbed for microscopic growth. Theoretically speaking, the comparison may, perhaps, be reduced to quantity of flushing water; but in order to secure the same result in large combined sewers that we have in the small pipes of the separate system, the difference in the amount of flushing water is simply enormous beyond all *practical* consideration. Much has been said about the obstruction of sewers in Memphis by bones, chips, etc. It is a sufficient answer to this if we say that during the three years of use of the whole system, beginning with a length of eighteen miles and now double that length, there have been in house drains and sewers together only 75 stoppages; not more than half of these have been in the sewers, being equal to one stoppage per year for each three miles of the system. It is also to be considered that these stoppages occurred mainly at the outset and in undue proportion, in the work of a single engineer, who was evidently careless in making the joints between the pipes. The inconvenience to traffic and the cost of the work has been practically nothing, far less to either than would have been any system of inspection at man-holes and lamp-holes. The absence of man-holes was adopted originally from motives of economy. Careful observation and consideration have shown me that with sewers constructed as are those at Memphis, and efficiently flushed as they are, it is far better not to have man-holes and lamp-holes than it is to have them. I should not allow their construction if they cost nothing. They are much more likely to lead to the introduction of obstructing rubbish from the surface of the street than they are to aid in the removal of obstructions. In this conclusion I am sure that I am sustained by the official engineers of Memphis, who have had so much experience in the management of that work. The hand-hole pieces referred to by Prof. Baumeister are not inserted only where pipes are broken into to remove obstructions. They are placed at regular intervals along the line during construction and are carefully indicated on the plans; so that when obstructions are to be removed, they may readily be found, and the breaking of the pipe may be avoided.

My observation in European cities, where catch basins are used, has satisfied me that, whatever may be "our ideas" on the subject, those catch basins are often a disagreeable and marked nuisance, not so much so there as here, but sufficiently so to be considered objectionable.

On the question of ventilation, I must differ entirely in theory and in practice from Prof. Baumeister. In my judgment, he is entirely wrong with reference to the relative ventilation of large and small sewers. The retardation of the movement of air by friction in sewers is practically limited to the retardation by friction in the ventilating channels, and will be of no practical account in any case. If the ventilation is through house drains and soil pipes, it is here and not in the larger sewer that the controlling retardation will occur. A given amount of ventilating opening will move the air with which it connects, not perceptibly in proportion to the size of the chamber containing that air, but in proportion to the movement through the opening itself. Furthermore, one of the strongest ventilating agencies in sewers is the movement of the water flowing through them, producing an effect by friction on the superincumbent air. In the small pipe this movement will be communicated to the whole of the contained atmosphere, while in a large sewer there will be comparatively little effect, except on those layers which are within a few inches of the surface of the moving water. Where flushing appliances are used, the influence of the sudden discharge on the contained atmosphere of a small sewer insures complete renewal. With large sewers its effect would be but slightly greater than that of the ordinary stream. The Professor's subsequent reasoning on this subject, being founded in error, seems to me erroneous throughout, and I am confident that anyone who will thoroughly examine the sewers of Memphis and compare their condition with that of the best sewers constructed, even by Lindley, in Europe, will confess that there is practically a radical difference as to odor between the two.

If my comments are well founded, I think that I have shown a sufficient reason for disregarding Prof. Baumeister's conclusion, that the decision as to whether to use the separate or the combined system should rest on considerations of finance rather than of sanitary condition.

In closing, I must refer to the statement that, inasmuch as water seal traps separate the air of our houses from the air of the sewer, the bacterial growth may be disregarded. He says: "Only a relative, not an *absolute*, difference exists between both systems, and, so far as the safety of the population is concerned, this difference does not amount to more than that which exists between a wild animal confined in a cage, or not existing at all in a country." For my part, I adhere strongly to the opinion that this kind of wild animal had better not exist "at all in a country," and that if it does so exist, we shall need something more efficient than water seal traps to confine it to its insecure cage. This is a case where absolute prevention is the best and only proper protection.

GEORGE E. WARING, JR.

AN EXPLANATION.

MADISON, WIS., *May* 18, 1883.

To the Editor of THE SANITARY ENGINEER:

In the Construction Notes of your issue of the 10th inst., a copy of which I have just seen for the first time, you have a few lines referring to the Madison, Wis., Water Works, which are liable to create a very erroneous impression. The newspaper article from which you quoted was written because of impatience at the delay in completing the work, due to the following circumstances:

1st. The city, in attempting to obtain a supply of water from artesian wells, unfortunately awarded that portion of the contracts to an incompetent man, although he came well recommended, and when he failed to do what he contracted to do, he had no alternative but to "pack up his tools and leave the ranch." 2d. The contractors for machinery and foundations tried to do some "scamp" work on the latter, which I refused to pass, and their bondsmen had to take it out and replace it—the contractors having made an assignment during the past winter. This contract should have been completed late last fall, but the wells being unfinished, and the city not having a supply of water sufficient to test the machinery, did not insist upon a speedy completion of the work, but made temporary arrangements for supplying the city with water until the machinery could be completed. Other than the above, there is nothing that could come under any possible meaning of the term "sloppy work," and it naturally caused some "friction."

Since Dec. 1 the city has been supplied fully and regularly with water for domestic purposes; besides, the works, as now running, were the means of extinguishing what might have been a very serious fire at the large plow manufacturing works here.

The reasons why "no considerable portion of the citizens are yet supplied with water," are that until lately there was but one plumbing establishment here, and that there have been but eight weeks since the time we were ready to supply water during which the ground was not frozen so hard as to prevent making service connections. In that time about one hundred connections have been made, and applications are coming in faster than the connections can be made.

Very courteously yours,

C. B. DAVIS, *Engineer*.

[THE SANITARY ENGINEER simply made an abstract from the *Wisconsin State Journal's* account of the condition of things, making no comment thereon. It prints, with pleasure, Mr. Davis' explanation.—ED.]

CEMENT FOR GLASS PIPES, ETC.

BOSTON, *May* 10, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you please inform me what you consider the best kind of waterproof cement for connecting glass or pottery ware set in iron frames, like the glass pieces used in such water closets as the "Hartford Glass Closet?" In this closet a waterproof elastic cement is used. I see, however, by the London *Sanitary Record* of February 15, 1883, p. 362, that a silicated mastic is referred to as inalterable as glass for use in cementing glass coffins, and rendering them hermetically sealed.

Do you know of such a cement or mastic? If not, what kind should you think would come the nearest to the ideal referred to in the *Sanitary Record* for this kind of work?

Very respectfully yours, SUBSCRIBER.

[A practical glass-blower recommends the following for attaching glass to metal: A quantity of litharge is placed in a cup, into which is poured glycerine and stirred until about the consistency of condensed milk; this cement is waterproof, and will stand high temperatures. For cementing glass to glass, as glass labels on bottles, a mixture of three parts of resin to one of beeswax is used; this will not stand heat, however. We are not acquainted with the silicated mastic referred to by the *Sanitary Record*. In the construction of glass-lined iron pipe, plaster of Paris is used between the glass and iron, except for about an inch at each end of a section, where hydraulic cement is used. "Spon's Encyclopedia of the Industrial Arts, Manufactures and Commercial Products" gives many recipes for joining metal and glass, some of which you may find suited to your wants. The elastic cement used in the glass water closet referred to, can probably be obtained of the manufacturers of the closet.]

PAINTS FOR RADIATORS.

ST. JOSEPH, MO., *April* 30, 1883.

To the Editor of THE SANITARY ENGINEER:

You will confer a favor on me, and perhaps many others, by giving, through the columns of your paper, the best paints for painting steam radiators so as not to impair their efficiency. I should like a reddish brown color.

Yours respectfully, I. T. HOPPER.

[To prepare radiators for bronzing, wipe the oil off, and apply a coat of paint made of yellow ochre and boiled oil, with enough white lead in it to increase the "body" of the paint. When the painting is completed turn on the steam immediately and bake the whole until you can just break

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the skin of the paint with your thumb nail. Then allow the paint to become hard by air drying, when you may size and bronze to suit your taste. If after the bronze is properly set you put a coat of varnish over the whole, the good appearance will last longer.

If you wish to paint the radiators only use ochre and oil, and any pigments you like to get the desired shade, and bake with steam heat as above; then varnish.

Repeated heavy coats of paint impair efficiency, but not to the extent commonly supposed.]

LEAD BURNING.

St. Albans, Vt., *May* 10, 1883.

To the Editor of The Sanitary Engineer:

Seeing in your issue of April 26 a remark from M. R., I would like to ask him, through the columns of your valuable paper, to please explain how he can burn his lead boxes as handily with a hatchet-bolt as with a machine. I have been at the business twenty years, and have never yet seen lead burning with a hatchet-bolt.

Respectfully yours, Jack.

[We refer this to M. R., for the information desired.]

STUPID WORK.

Baltimore, Md., *April* 21, 1883.

To the Editor of The Sanitary Engineer:

Inclosed I send you two pen sketches of some jobs of plumbing work done by some of our so-called plumbers in Baltimore.

The sketch marked Fig. 1 was done by a man who is part tinner, part stove man and part bricklayer, and I suppose part plumber—in other words, Jack of all trades and master of none. The stench arising from it was so bad that the owner was compelled to have an examination made by another person. When the examination was made and the glaring defects pointed out, the botch of all trades contended it was all right and threatened to enter suit for damages to his business against the man who made the examination. For the sake of truth, and justice to the trade, I am heartily sorry he has not carried out his threat. The public ventilation such work would have received in a lawsuit would have opened the eyes of our people to the urgent necessity of official inspection of plumbing. No 1 is bad, but sketch No. 2 is worse, but was done by another person, and in the heart of our city.

If the owner's statement about No. 2 is correct, and knowing him, I believe it to be so (for the man who did the work I know to be fully competent to recommend such work), originally there were traps under the water closet, but he recommended the owner to take them out and use a straight pipe to one water closet, and an eighth bend connection in the other, using hoppers in both cases instead of the water closet.

The end of the soil pipe was open, I suppose for the purpose of cleaning out, as there was no water attached to one of the hoppers, and the open end was lower than the hopper, and when I saw it the filth was running over the top and down the groove in which the pipe was put. The only fastening the pipe had was a piece of washboard, on which one of the bell ends of the pipe rested. The joints were made with sulphur. It was impossible for the pipe not to stop up, even if it had a proper supply of water, because about one half of the lower end rested on a brick at the bottom of the groove, immediately in which the cesspool is located.

No proper language I could use would be strong enough to condemn such work, and the jail or penitentiary is the only fit abode for the men who do it. Plumber.

[Baltimore needs a good plumbing law, well enforced, so that men found guilty of doing such wretched work can be punished.]

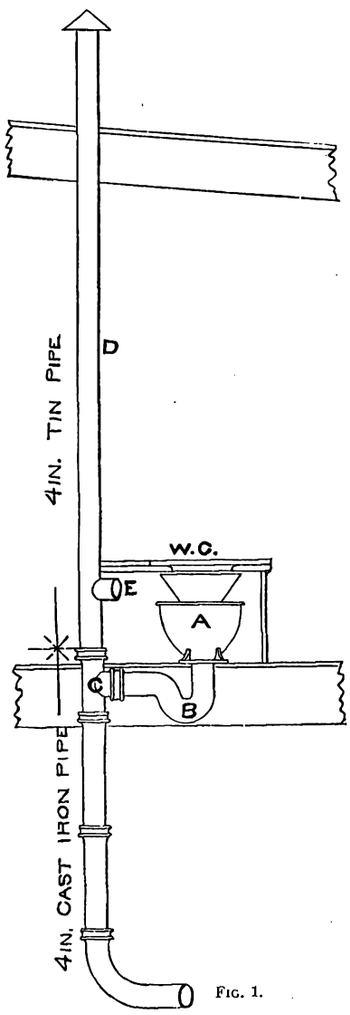

Fig. 1.

The pipe below the branch to which the trap is connected is 4-inch cast iron, and from the branch up, to and above the roof, is 4-inch tin pipe, with slop joints, and to make bad worse, there is a 4-inch opening in said pipe under the seat for to ventilate that space.

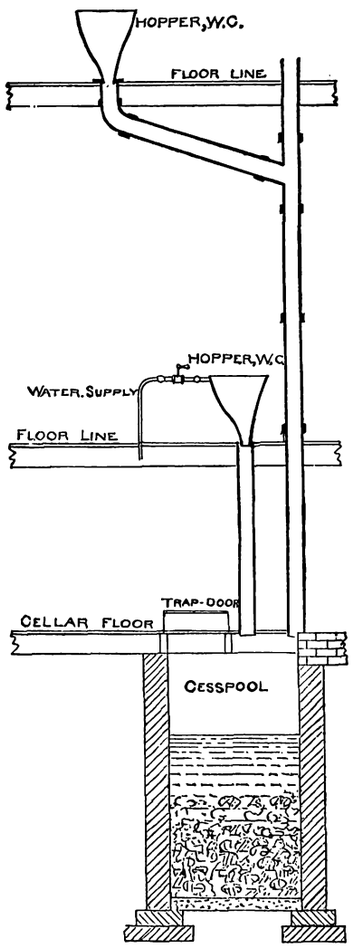

Fig. 2.

No attempt at ventilation in this case (except through the hoppers into the house or building), as offices on first floor and small manufactories on upper floors.

BOILER TOO SMALL.

Springfield, Mass., *April* 28, 1883.

To the Editor of The Sanitary Engineer:

I notice that you kindly answer questions on subjects treated of in your paper, hence the liberty I take.

In my private house, I have a boiler in connection with a low pressure steam apparatus, which has given me much trouble all through the winter, and the opinion of local experts leave me worse off than I was before I spoke to them on the subject, as they do not agree, three of them having three different theories.

The boiler makes steam rapidly enough, being a pipe boiler, when there is a good fire; but should the fire run down a little, and a fresh one be put in, it will take 10 or 15 minutes again before any steam will appear—not until the fire burns brightly. But this could be gotten along with, as the house is always warm enough, only for the fact that every time the steam goes down, the boiler fills up with water; which water has to be run off again if we want to prevent an inordinate amount of noise during the time things are getting into shape.

Where does this water come from?

I tested the automatic water feeder, and am pretty positive it does not leak, and to confirm my opinion in this respect I can say the boiler never fills when I am not using it.

One steam fitter said, "pipe boilers always act that way," and seemed to look on it as a foregone conclusion. Another said the boiler "made steam too fast," and carried the water into the pipes, while the third adhered to the idea of leaking under a certain condition, say when it is hot.

An early reply will be read with much satisfaction.

Very respectfully yours, W. H. C. C.

[The steam fitter who says the boiler makes steam too fast, evidently thinks that the steam when filling the pipes and radiators again, carries water up mechanically, which sometimes happen with poorly constructed apparatus, and the one who says all pipe boilers act that way, is influenced by the fact that pipe boilers are more likely to act so than shell boilers.

All pipe boilers do not act as you describe above, nor are all shell boilers free from the same trouble.

The number of pounds of steam which is necessary to fill all the coils, etc., and all the condensed water, which is in transit, represent the same number of pounds of water which have been drawn from the boiler during the time steam has been increasing in pressure. Or another way to make it plainer: one cubic foot of water will fill about 103 feet of what is known as one-inch pipe, or 95 feet of 1¼-inch pipe, and the same converted to steam at ten pounds pressure, though capable of occupying 1,000 cubic feet of space within the heaters, if no condensation went on, in reality occupies less than one-twentieth of that space in consideration of the water, which is forming dew-like on the internal surfaces of the radiators, and which is slowly running in the bottom of the pipes on its way back to the boiler, but of which may be said, though it goes out *on time* (in steam), it comes back *late* (in water).

Thus, if we imagine a pipe boiler made of 165 vertical one-inch tubes with the water-line within the tubes, before steam is gotten up, we will have to imagine the water one foot below the true or intended water-line after steam is up, for average conditions, should no water be admitted to the boiler.

But in ordinary apparatus with a feeder in good order, the feeder begins to let in water with a change of level of one-half inch, maintaining the boiler level while steam is up; but when the steam runs down, this water which has been the vehicle of the heat, begins to manifest itself again within the boiler, filling the boiler one foot higher than the intender or true water-line.

In a pipe boiler, with a drum on it, in a nearly horizontal position, with the water-line within the drum, this is different. For should the drum be only one foot in diameter by 6 feet long, with the true water-line in the middle of the drum, the fluctuations of the water for the same conditions could be only two-inches below or above the centre, requiring in one case a total range of two feet, and in the other only four inches if there is no water-feeder, and only half that difference with one.

Narrow upright shell boilers give the same trouble, though perhaps not in as great a degree, while in broad ones it is not perceptible.]

NOTES FROM CINCINNATI.

(From our Special Correspondent.)

The fire escape ordinance of Cincinnati is a failure. Following upon the excitement resulting from the Milwaukee calamity came a strong effort to force property owners to provide efficient means of escape from factories, boarding houses and hotels especially. The duty was imposed upon the Smoke Inspector. His threats to prosecute those who failed to provide escapes proved effective with but a small proportion of owners, each of whom determined for himself what he deemed sufficient. Some provided rope ladders to fling out or windows, some metal ladders running up the sides of buildings, and others mere excuses for compliance with the law. Most of them were so impracticable as to be mere death traps. The Inspector took a rope ladder man into court, and the court ruled the rope ladder to be a compliance with the ordinance, which loosely requires "a ladder or other sufficient means of escape." The hotels afraid of their reputations for safety, are nearly the only class of buildings which the inspector can control. These have been furnished with iron ladders and proper platforms to enable the occupants to find a footing upon them. A great local holocaust seems necessary to arouse public sentiment to the point of compelling the erection of

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escapes. Public sentiment, it has been very clearly determined, is the only law in Cincinnati.

The consumption of smoke in this beclouded city may be said to have ended in smoke. Under the stimulus of a new ordinance and a man to enforce it, the nuisance has been somewhat abated; but devices have had their day and the general public is settling down to the conviction that the careful stoker is the only smoke consumer.

The frequency of boiler explosions in the Ohio Valley, and in fact their frequency everywhere, attended as they usually are with the destruction of both life and property, is a matter which seems to demand a more thorough scientific inquiry than it has yet received. The injection of water into boilers, which, through the carelessness of engineers, or a failure of the supply pump to work, have been permitted to become full of super-heated steam from a little water, doubtless accounts for some of the explosions, but by no means for all. Some time ago, in a case pending in our courts for damages resulting from the explosion of a boiler, a gentleman in the witness stand related the following interesting experiment: He constructed a small boiler some three feet in length by a foot in diameter and attached to it a guage. Through a packing box on the top he passed a rod to the end of which within the boiler he attached a perforated pan as large as could be conveniently raised and lowered within the boiler. Allowing it to rest below the water line, he made twenty pounds of steam. Then standing above the boiler he raised the pan quickly above the water line into the steam space. By reason of the numerous small streams flowing from the perforated pan a large surface of water became exposed in the steam space. He looked at his guage, and, behold, the dial hand showed a pressure of forty pounds. The pressure had doubled instantly. He dropped the pan below the water line precipitately, feeling thankful that he had not tried his experiment with his little boiler at a fifty pounds pressure, as in that event he would not probably have been present in court to testify to the result of his experiment. The theory of course is that the water brought suddenly up into the steam space was instantly vaporized by the latent heat. Against this theory, or despite this fact, if it be a fact, some engineers persist in feeding their boilers into the steam space directly, and claim that it is in no way dangerous. Indeed, there is no settled opinion upon the subject among practical operatives, and science ought to investigate. The priming or frothing of boilers, since it involves a danger against which the most watchful engineer cannot always guard, is also a matter for thorough investigation. The use of crude petroleum oil in boilers, with a view to prevent scales, is doubtless one prolific source of foaming. That any oleaginous scum or surface on water will produce such a result the cook's kettle daily demonstrates. The last boiler explosion here, occurring in the Globe Rolling Mills, general opinion refers to the use of oil. Generally, however, the causes of boiler explosions are veiled in mystery. A prominent engineer of this city, whose official position requires that his attention should be given to this question, says that he has noticed that the explosions of boilers are far more frequent among those using the waters of the Ohio and its tributaries than among those using the waters of the Northern Mississippi; and that those explosions nearly always occur during high water when it holds the greatest quantity of earth in solution. Insomuch as vegetable and mineral substances rise to the surface of water when ebullition begins, the explosions may be referable to the foaming likely to result. Your correspondent, however, makes no pretension of ability to solve the mystery. What part the carbonate of lime forming as a scale within the boilers may perform as an agent of destruction is a mere matter of speculation, and that as a poor conductor of heat it necessitates an increased expenditure for fuel in some proportion to its thickness every engineer knows. He knows also that the boiler plates are in consequence kept at a much higher temperature than they could attain to if directly in contact with the water, and that when it gathers in sufficient quantity over the furnace, the plates often attain a temperature so great as to bag down. The gathering of scale is the engineer's chief dread, and numerous devices to prevent it are resorted to. Until the theories of boiler explosions are solved it must continue to be a matter of interest to manufacturers and engineers, thousands of whom are daily asking for information.

A small-pox sufferer wandered around the Municipal Building in Brooklyn, last week, looking for the Health Department to take charge of him, and found a great scarcity of clerks who were willing to direct him. He was finally sent to the small-pox hospital at Flatbush.

Dr. J. H. Raymond, Health Commissioner of Brooklyn, asks the Board of Estimate to grant a hearing on the establishment of a hospital for contagious diseases.

Dr. J. S. Billings has been selected by the Secretary of War to represent the Medical Department of the Army, at the annual meeting of the American Medical Association, to be held in Cleveland next month.

At a recent meeting of the Newport Sanitary Association, Mr. A. B. Almon, of Salem, Mass., was elected treasurer in place of Mr. T. G. Ford. Professor Raphael Pumpelly presented an important report as to that portion of Easton's Pond from which the city's water supply is obtained. Persons before renting cottages take the trouble now to ask for a certificate from the Sanitary Association before taking a lease and by such wise action compel the sanitary arrangements to be in the best possible condition.

Walter J. Morris, C.E., died in St. Luke's Hospital on the evening of the 16th instant. He projected the Broadway underground railway, and was the engineer of the South Ferry and direct transit enterprise in Brooklyn.

On May 11, at a meeting of the Society of Medical Jurisprudence, a paper on "Prison Sanitation," read by Charles R. Kitchell, was discussed by Prof. Rice, of Columbia College, Dr. Spitzka, Dr. C. S. Woods and others.

The Hygienic Exhibition in Berlin was formally opened, on May 12, by the Crown Prince, Frederick William. A large number of State and city officials and many deputations were present at the ceremony.

Mr. Otto, the inventor of the gas engine of that name, has again instituted proceedings against unscrupulous parties for infringing his patents. Mr. Otto's right to claim a royalty from defendants in such cases has always been upheld.

The Wisconsin Legislature at its last session enacted a law which makes obligatory—first, the organization of a board of health in every town, village and city in the State within thirty days after each annual election; second, the appointment of a health officer by every board of health within ten days after its organization; third, the report of contagious diseases by all physicians.

An explosion of gas in a street sewer in Peterborough, Eng., recently, was attributed to dynamite and the Irish conspirators.

The Parkes Museum of Hygiene will be opened in its new quarters May 26. The use of the museum will be given to teachers of sanitary science, for instructing their pupils in the management of sanitary appliances.

To represent Western architectural and building interests, *The Inland Architect and Builder* has been established in Chicago. The journal is well printed—and this, by the way, is a noticeable feature of the latest class publications which we have seen—and gives considerable information about architects and architecture in the chief Western cities. It is issued by the Inland Publishing Company.

PLUMBING LAW VIOLATION.

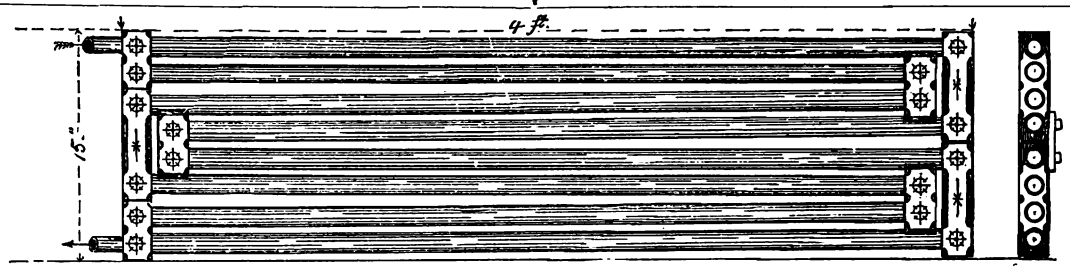
Only three violations of plumbing regulations were reported to the health department of this city during last week, viz., two by Inspector Hooper and one by Inspector Hicinbothem. All were of a trivial nature. One violation of a light and ventilation plan was reported by Inspector Berry. No cases were referred to the attorney.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

NEW COIL.

Our illustration this week shows a flat coil of eight one-inch steam pipes, four feet long and set one over the other,



each pipe having a pitch in the direction of the steam of $\frac{3}{16}$ of an inch and occupying a perpendicular height of only 15 inches over its greatest measurements.

The bends are what is known by the steam trade as "box bends," and are so constructed as to hold the coil together without being strapped in the ordinary way, which show the straps; a butt plate tapped on the inside of the large bends being all that is required.

Each two pipes pitch in the same direction and the coil may be said to be in two sections, giving only a length of about 16 feet from inlet to outlet.

It was designed by one of our correspondents, to be used under parlor windows for hot water, though it will work equally well for steam.

Construction Notes.

CONEY ISLAND.—The contract for constructing about two miles of sewers has been given to the Improved Sewerage and Sewage Utilization Company, of New York.

MICHIGAN CITY —Bids for Northern prison sewer were opened May 12. The lowest was W. H. Meyers & Son's, Fort Wayne, $8.47 per foot. The award of contract has been deferred.

ANN ARBOR, MICH.—The Common Council have appointed a committee who will consider the question of water works.

NORTHAMPTON, MASS.—Engineer E. C. Davis has been making plans for the proposed reservoir in Roberts' Meadow Brook. Two reservoirs are talked of—one near the Roberts' Meadows to contain 15,000,000 gallons, the other at Bridgman's Farms to contain 99,000,000 gallons. The present reservoir has a capacity of only 4,000,000 gallons.—*Engineering News.*

RAILROAD BRIDGE.—The contract for a bridge over the Whitewater River, for the Cincinnati, Indianapolis, St. Louis & Chicago Railroad, has been awarded to the Keystone Bridge Company, at $21,000.

BELOIT, WIS.—A private company, Mr. John Hackett, President, has the construction of water works in hand, to be finished before next winter, at a cost of $100,000.

WEST SHORE RAILROAD CONTRACTS.—Plans for construction and repair shops at Frankfort, N. Y., to cost from $500,000 to $600,000, have been prepared. Contractors must submit bids to the New York office by June 1. The contract for the round-house has been awarded to W. Dickinson and C. L. Merrick, of Syracuse, at $52,000; for gas works for the railroads' use, to Moore & Carr, also of Syracuse, for about $25,000.

PHILADELPHIA.—The following contracts were awarded by the Highway Committee of Councils for constructing a main sewer from Fairmount to Girard Avenue Bridge: this contract was divided into three parts, first part being awarded to Cornelius Kennedy at $50 per cubic foot, second to P. S. McTague at $18 per cu. ft., third to Cornelius Kennedy at $16.18 per cu. ft.

CHICAGO.—Proposals for constructing several miles of brick sewers will be opened May 26.

The strike of the bricklayers, which goes on unchecked, has stopped, temporarily or permanently, for the season, three-fourths of building.

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PHILADELPHIA.—It will be remembered that the Board of Experts, in a recent report, recommended that surveys and analyses of waters be made for determining possible sources of the future water supply of the city. These operations will be prosecuted at once. The surveys will be under the charge of Mr. Rudolph Herring, C.E., of this city, and the analyses of the water will be made by Prof. Albert R. Leeds, of Hoboken. The surveys include the territory upper Delaware, the Lehigh, Perkiomen and Schuylkill. Surveying parties will be sent out at once, and preparations are now making for rainfall observations, and gauging of possible sources of supply.

An ordinance has been reported favorable by the Highway Committee of Councils, for macadamizing South Broad street to Passayunk and Moyamensing avenues.

The Select Council, on May 17, passed the ordinance authorizing the Market Street P. R. W. Co. to lay a cable. This privilege is granted, providing the company reduces the fare to five cents.

LONG ISLAND.—The Long Island Water Supply Company has started to build its works to supply New Lots with water. The reservoir will be stationed on the hill upon which the Ridgewood reservoir is located, in that portion formerly known as the East New York Grove. Men are now clearing off the woods. The water pipe is being laid, and it is expected that the works will be in operation by the fall.

COLUMBIA.—The contract for the construction of the new centre building of the State Lunatic Asylum was given, May 3, by the regents, to Mr. R. W. Johnson, of Columbia, for $48,500.

KINGSTON, N. Y.—The Kingston Water Company, of Kingston, Luzerne County, was chartered at the State Department May 16. It has a capital of $30,000.

BIRDSBORO, PA.—The people of Birdsboro, Pa., are building water works at a cost of $40,000. The reservoir will hold 1,000,000 gallons.

ALBANY.—The Anglo-American Petroleum Company, formed for drilling oil wells, etc., in Genesee and Allegany Counties, was incorporated on May 15, with a capital of $750,000.

ALBANY.—Incorporated on the 14th were the New York Metal Exchange, formed to foster trade and commerce etc., capital stock $4,000; the New York and Rudolstadt Pottery Company, for the manufacture and sale of artistic and useful pottery, to be located in the city of Rudolstadt, Thuringia, Germany; capital $100 400.

BUFFALO.—The following bids for construction of Section C, of Trunk Sewer, were received by the Board of Sewer Commisioners, May 7: Lowry & Barton, Cleveland, Ohio, $139,361.50; A. H. Delamater, Cleveland, O., $128,204; McComas & Robbins, Cincinnati, O., $129 475; Chas. E. Williams, Buffalo, N. Y., $169,999. Contract awarded to A. H. Delamater at his bid.

NEW YORK.—The certificates of incorporation and articles of association of the Northern and Southern Telegraph Company were filed in the County Clerk's office May 15. Its capital stock is $100,000. The corporators are Ed. H. Hawkins, Chas. C. Sheldrake, Joshua Karnes, Wm. H. Hatfield, and Wm. S. Karnes.

NEW YORK.—At the office of the Board of Commissioners of the Fire Department, May 16, the contract for the furnishing of 2,000 feet of hose, was awarded to the Gutta-percha and Rubber Manufacturing Co., at $1,700; also the contract for furnishing hose, a new boiler to fire engine No. 6, and making repairs to said engine, was awarded to Clapp & Jones Manufacturing Company, at $1,300.

NEW YORK.—At the Department of Docks, May 21, the following contracts were awarded: For repairing pier (new) 43, North River, to Ryan & Cody, for $31,061; for repairing shed on pier (new) 43, North River, to Dever & Coddington for $66,000; for painting shed on pier (new) 43, North River, to Joseph D. Bliss, for $22,037. At the Department of Public Works, the following contracts were awarded, May 16: Sewer on 1st ave., between 13th and 14th sts., to Lawrence Rock, $1,188; sewer in 29th st., between 1st ave. and East River, Nutt & Kearns, $3,537.72; sewer in 125th st., between Boulevard and 10th ave., Lawrence Rock. $5,158; sewer in 127th st., between 8th ave. and Avenue St. Nicholas, Nutt & Kearns, $1,136; paving 70th st., from 1st to 2d aves., with trap block pavement, Wm. A. Cummings, $6,741.15; paving 97th st., from 1st to 2d aves., with trap block bavement, and laying crosswalks, Charles Guidet, $5.118.68; paving 97th st., from 2d to 3d aves., with granite block pavement, Charles Guidet, $5,065.12; paving 109th st., from 1st to 2d aves, with granite block pavement and laying crosswalks, Dennis McGrath, $4,827.20; paving 121st st., from 4th to Madison aves., with granite block pavement, Charles Guidet, $3,523.90; paving 127th st., from 7th to 8th aves., with granite block pavement, and laying crosswalks, Thos. Murray, $5,823.82; paving 128th st., from 7th to 8th aves., with granite block pavement, and laying crosswalks, Thos. Murray, $5,840.53.

PHILADELPHIA —Chief Engineer Ludlow suggests, in a report to the Water Department, the completion of East Park Reservoir and connections, at an estimated cost of $1,200,000. The completion of the new Cambria Basin and connections, at an estimated cost (exclusive of land damages) of $720,000. The completion of the new basin at Mount Airy at a cost (exclusive of land damages) of $225,000.

POINT PLEASANT CITY, N.J.—A company, with the title of the Point Pleasant City Water Company, has been organized to supply this section of the sea-coast with water.

GOVERNMENT WORK.

Custom House, etc., Toledo, Ohio.—Synopsis of bids, for labor and materials, opened May 16, 1883: Edward Moline, $49.000; Geo. O. Cooke, $40,900; Davidson & Marshal, $36,694; Miles, Cramer & Horn, $42,000; Belknap & Dumesne, $65.500; Edmund Knapp, $59,000; M. A. McGowan, $43,000; D. McCarty, $51,400. Davidson & Marshal awarded the contract.

Custom House, etc., St. Louis, Missouri.—Synopsis of bids for iron railing for areas; advertisement of April 14, 1883, opened May 4, 1883: Christopher & Simpson, St. Louis, $1,614; J. H. Van Dorn, Cleveland, $1,067.72; Kinsely Miller, Chicago, $2,088; Snead & Co., Louisville, $1,118; Champion Iron Fence Co., Kenton, O., $1,213.25; Hugh Ketcham. Indianapolis, $1,097.60; Ætna Iron Works, Quincy, Ill., $896; Sherfe Kokur, St. Louis, $1,600; Stupp Bros., $1,882.75. Ætna Iron Works was awarded the contract.

The Potomac Flats Improvement.—Bids were opened, May 16, at the office of Major Peter C. Hains, for filling about six acres of the Potomac flats, in the vicinity of Easby's Point: Andrew Gleason, 29 cents per cubic yard; M. A. McGowan, 29⅙ cents; J. A. Blundon, 29 cents; Jno. Cudmore, $33\frac{49}{100}$ cents; Wm. H. Mohler, 45 cents; Albert Gleason, 34½ cents. and Wm. Buckley, 34 cents. It is estimated that the amount of material to be removed will be about 49,000 cubic yards.

The Commercial Underground Electric Company, of this city, filed articles of incorporation May 17.

The Pneumatic Clock Co., of New York, have secured an order for 200 clocks for the Produce Exchange.

Mayor Edson's cabinet have requested Governor Cleveland to veto the Roesch bill, preventing the Board of Health of this city from prohibiting the use of stoneware pipe, which, as we go to press, is under the Governor's consideration.

The Charing Cross and Waterloo Electric Railway Company, has let a contract for the construction of a tunnel two-thirds of a mile long under the Thames River. The Messrs. Siemens have contracted to operate the railway for $25,000 a year, and one-fifth of the gross receipts in excess of $100,000.

SEWERS IN FLAT DISTRICTS.

The Lancet publishes the following letter from Robert Rawlinson, C. B., Chief Engineer Inspector of the Local Government Board.

SANITARY CONDITION OF CALCUTTA.

To the Editor of "The Lancet."

SIR: The inclosed letter was written at the request of Dr. Mouat, on the state of the sewers and drains at Calcutta, as detailed in *The Lancet* of the 24th inst. If you wish to use the letter it is at your service,

I am, Sir, yours truly,

R. RAWLINSON.

DEAR DR. MOUAT: I have looked over the remarks in the *Overland Mail* (Calcutta), of January 9, 1883, as to the condition of the main sewers and drains in that city. It appears that certain outlet sewers are large, and that tributary sewers and drains contain sediment, and are offensive. There are also statements that sewage sediment is allowed to accumulate both in the large main sewers and in the tributary sewers and house drains, consequent on absence of flushing, disease in excess, especially cholera, being attributed to the stenches from the sewers and drains. The large main sewers connect with the tidal river. There are about thirty-four miles of tributary sewers, and it said about fourteen million gallons of water per day pass out of the sewers. It is difficult to advise as to works in India other than on general principles. The following remarks and suggestions must therefore be taken for what they may be worth—namely, as the opinions of one who has had a wide experience, and who also has paid much attention to the subject. As a rule surface water in a tropical climate ought not to be carried away through sewers, as these should be proportioned to the volume of sewage. Natural watercourses may be improved, but should not be converted into sewers. Sewers formed in a flat district, and porous subsoil, should be of the best material; the bottom of the trench should be made watertight to prevent leakage of the fluids of sewage. The sewers and drains, in construction, should be absolutely true in line and in gradient, and should also be absolutely watertight, as, if not, the fluids will escape at the joints, leaving sediment to ferment and putrefy. All sewers and drains should be regularly flushed at short and regular intervals, as the ordinary flow of sewage is not, in all cases, in flat sewers, sufficient in volume to remove the sediment. Sewers and drains may be flushed each day, from an automatic flushing chamber, with a comparatively small volume of water, as under:—

DIAMETERS OF SEWERS AND DRAINS.

	Diameters.	Gallons for one foot.
Pipes	6 inches.	[illegible]
"	9 "	[illegible]
"	12 "	[illegible]
"	18 "	[illegible]
"	24 "	[illegible]

The above volumes of water may be liberated through the drains and sewers in from three to five minutes. To remove old deposits the flushing should be repeated as fast as the flushing tanks can be filled until the drain or sewer has been cleared. If the drains and sewers leak into the the subsoil, flushing may, in some cases, cause damage by washing away the sandy subsoil. I know of no remedy but repairs at such points with Portland cement. Sewers and drains in a flat district require unceasing attention in any climate, but under the climate of Calcutta unceasing special attention will always be necessary. Sewers and drains must have full means for ventilation that any gases of decomposing refuse may be dispersed and diluted in the open air. Stenches are offensive in the open air, but they do not kill, as when admitted within inhabited houses. If sewer and drain flushing has been neglected in Calcutta, greater attention to this necessary process will tend to reduce the nuisance caused by the unflushed and foul drains and sewers.

I am Sir, yours truly,

ROBERT RAWLINSON, C.B.

Chief Engineer Inspector, Local Government Board. Member of the Army Sanitary Committee.

PHILADELPHIA ENGINEERS' CLUB.

At the meeting, May 5, Mr. C. G. Darrach spoke with reference to the relative quantity of water at the top and bottom of deep reservoirs, and discussed the methods of meeting the difficulty encountered in the accumulation of impurities below the surface. A new method of manufacture of corrugated boiler tubes was discussed by Mr. George S Strong. The progress and condition of the manufacture of artificial fuels was sketched by Mr. E. H. Lorsean. Mr. T. M. Cleemann exhibited a map and profile of the Southern Pacific Railroad in California, showing where it crosses the dried-up bed of a lake, and attaining a depth below the surface of the Pacific Ocean of 266 feet. He also showed a number of photographs of the Tehachapi Pass on the same railroad near San Fernando. In order to attain the summit with a sufficiently reduced grade, the line was "developed," advantage being taken of a conical hill to wind about it in the form of a helix, crossing itself, and continuing on its way with several meanderings.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Society met at 8 P. M., May 16, Vice-President Wm. H. Paine in the chair, John Bogart Secretary.

Detailed announcements were made as to the convention, to be held at St. Paul and Minneapolis, beginning June 19, 1883. The paper recently published in *Transactions*, "On the increased efficiency of railways for the transportation of freight," was discussed at length by Mr. O. Chanute, and also by Messrs. Cooper, Forney, Emery, Hamilton and Shiner. Mr. F. J. Cisneros, M.Am. Soc., C.E., who recently visited the Isthmus of Panama, presented an informal statement of the progress of the work upon the Panama Ship Canal. He said that the line had been completely staked, cross sections taken, and the location made and stakes set for definite work for a large portion of the line. The contractors, Messrs. Haven & Co., for dredging the canal from Colon, have their first dredge in place, and will commence work directly. Much money has been spent in the purchase of materials for the work, including excavators, dredging-machines, and portable track. The company has ordered fourteen American locomotives, of which nine are now in service. Hospitals have been erected at Panama, and the health of the laborers is very much better than has generally been understood.

SEWAGE POLLUTION OF THE THAMES.

The Royal Commission on the Metropolitan Sewage Discharge, which was appointed last June in deference to reiterated complaints of the foulness of the Lower Thames, will probably complete its difficult and tedious task before long. Fortunately the Commission is an excellent one. With Sir John Coode, Mr. Abernethy, and Colonel Ewart as engineers, and Prof. Williamson, Dr. De Chaumont, and Dr. Stevenson as chemists, we have what dramatists would call a very strong cast. The inquiry has to a certain extent a judicial character. It has resolved itself into a kind of duel between the Metropolitan Board of Works, who devised and defend the present system, and the Corporation of London who, as port sanitary authority, lead the attack on what they hold to be a foul and disgraceful

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nuisance. Each side is represented by counsel, and each side is doing what it considers its duty in bringing forward all the evidence it can collect. As to some of the facts, there can, of course, be no dispute. The sewage of nearly all London is thrown into the Thames, between Woolwich and Greenhithe, and no one can deny that the river is fouled by the excreta of nearly four millions of people. But the Metropolitan Board, who created the present outfalls, contend that the pollution is not of a serious kind, that it is rapidly removed by natural oxidation, and that if any evil arises from the sewage pollution it is not an actual, but merely a sentimental, one. At present, almost all the witnesses called have been on the side of the Corporation, and have testified to the existence and causes of the nuisances. Of the scientific witnesses there were Dr. Collingridge, Medical Officer of the City, Dr. Lionel Beale, and Dr. Corfield, as physicians; Mr. Baldwin Latham, Mr. Mansergh, Mr. More, Mr. Birch, and Professor Unwin, as civil engineers; Dr. Tidy, Professor Frankland, Mr. Way, Mr. Heaton, and Professor Tuson, as chemists; Mr. Whitaker, as geologist; and Mr. Symons, as meteorologist. The evidence given by these gentlemen was extremely elaborate, and will require careful examination when the time comes. But the other side has still to be heard, and will be represented by men of the highest scientific reputation. We prefer to reserve further remarks until we hear what Dr. Dupré, Mr. Able, Professor Voelcker, and the rest of their colleagues have to tell us. —*Lancet.*

THE PINGSUEY TEAS.

The injunction issued two weeks ago, stopping the sale and the removal of some 3,600 packages of Pingsuey teas, has been amended so as to include the proprietors of stores, F. W. Bampton & Co., 206 South street, where it is said about 1,000 packages belonging to a Boston firm, who were not mentioned in the former papers, had stored it. It was reported that these packages had been sold at private sale, and no notice having been served on the store keeper, it was the intention to remove them and give the authorities the slip. The action was taken to prevent such a contingency.

INDIAN TEAS.

The following is an analysis of a lot of Indian teas which were sold at auction on May 17.

Extract	37.80 per cent.
Total ash	6.24 " "
Ash soluble in water	4.28 " "
Ash insoluble in water	1.96 " "
Ash insoluble in acid	0.16 " "
Insoluble leaf	47.12 " "

The report also states that the tea contains neither foreign nor exhausted leaves, nor coloring matter.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

7th av, n w cor 57th st, br flat; cost $650,000; o, Thomas Osborne; a, J. E. Ware....Lexington av, s w cor 112th st, br flats; cost $16,000; o, Warren P. Tompkins; a, Arthur Arctander ...164 and 165 West st., br st, cost $17,972; o, W. R. Renwick; a, George M. Huss; b, G. M. Platt....42d and 43d st, 185 e 1st av, br stable; cost $8,500; o, C. H. Wilson; a, Charles Graham & Son... 317 East 114th st, br ten; cost $18,000; o, Wm. Fernschild; a, George Fernschild; b, owner... 345 East 114th st, br ten, cost $10,000; o, Barker & Smith; a, Alf. Chamberlain; b, owner....Broadway, n e cor 132d st, br stores, cost $10,000; o, G. W. Grooves; a, J. F. Burrows; b, A. D. Edwards ....Seaman av, n s, 230 e Bolton Road; fr dwel, cost $6,000; o, Isaac M. Dyckman; a and b, Sammel L. Berrian....Broadway, n w cor 9th st, br st, cost $100,000; o, Trustees Sailors' Snug Harbor; a, Wm. Field & Son....Washington, Fulton, West & Vesey sts, iron market house; cost $225,000; o, City of New York; a, Douglas Smyth....170 and 172 West 10th st, br flats, cost $50,000; o, Mary E. Cole; a, Alf. E. Thorp; b, B. Grissler & Fausle. .110 and 112 East 59th st, br club house, cost $90,000; o, Progress Club; a, Emil Grame; b, Westbrook, Myers & Co ...80th st, s s, 125 w 4th av, br dwel; cost $35,000; o, Sigmund Offenheimer; a, Leopold Eidlitz; b, Van Dolsen & Arnott ....80th st, s s, 125 w 4th av, br dwel; cost $28,000; o, Isidore Kaufman; a, Leopold Eidlitz; b, Van Dolsen & Arnott....4th av, n w cor 124th st, br ten and store; cost $12,000; o, Chas. Welde; a, Babcock & McAvoy....55 and 57 Frankfort st, b st, cost $35;000; o, Barnes & Merritt; a, Jno. McIntyre; b, Robinson & Wallace.

ALTERATIONS, NEW YORK CITY.

86, 88, 90 and 92 Canal st, br stores; cost $15,000; o, S. D. Babcock; a, Richard Bergen; b, Wm. G. Slade....278 and 280 Second st, rear; br school; cost $2,500; o, Board of Trustees of 2d Street M. E. Church; b. Richard Shafter ..49 Wall st, br and stone office; cost $8,000; o. U. S. Trust Co.; a, Henry Dudley; b, Frank Lynes ... 2029 Third av, fr dwel, cost $4,000; o, Leopold and Felix Metzger; a, Julius Boekell....S e cor Dover and Pearl sts, br and stone build, cost $15,000: o, R. K. Fox; a, John Rogers ...221 and rears of 223 and 225 East 34th st, br stable; cost ab $5,0-0; o, N. Y. Condensed Milk Co; a, Richard Bergen; b, J. S. Smith....117 Waverly Place, br dwell; cost $8,000; o, Delia M. Reynolds; a and b, H. M. Reynolds....59th st, br school; cost $10,000; o, Gibbens & Beach; a, Douglas Smyth....175 McDougal st, br house, cost ab $10,000; o, F. A. Stout;a, H R. Marshall; b, W. and T. Lamb..215 and 217 East 36th st, br stable; cost $3,000; o, Alex Hadden; a, F. J. Camp . 118 East 40th st, br dwell; cost $3,500; o, Emma H. S. Merrill; o, J. C. Cady & Co; b, Sinclair & Wells.

BROOKLYN.

Van Dyke st, n s, 100 w Van Brunt st, fr ten, cost $6,000; o, H. Niemetz; a, Th. Leibbrand; b, P. Kelly & Son and Gershon & Leibbrand....DeKalb av, s s, 66 w S. Elliott pl, four b stone tens, cost ea, $6,000; o, George W. Brown; b, L. E. Brown....Quincy st, s s, 100 w Tompkins av, five br stone dwels, cost ea $5,500; o and b, James W. Stuart; a, F. Weber... Berkeley pl, s s, 109 e 7th av, three br stone dwels; cost ea $10,000; o and b, E. B. Sturges; a, A. Hill. .. Park av, n e cor Marcy av, fr store and ten, cost $5,000; o, Fred. Miller; a, Th. Engelhardt; b, W. Rauth....Willoughby av, s s, 277 e Nostrand av, br stone dwel; cost $8.500; o, J. F. Saddington; a and b, T. B. Saddington....Willoughby av, s s, 200 e Nostrand av, four br stone dwels, cost ea $6,500; o and a, same as last. Greene av, s e cor Nostrand av, seven br st tens, cost ea $10,000; o, Michael Rawl; a, Parfitt Bros; b, Geo. B. Dearing....Sterling pl, s s, 100 w 6th av, six br stone dwels, cost ea $8,000; o, Henry Lansdell; a, C. B. Sheldon....579 and 581 Leonard st, w s, 200 n Nassau av, two fr tens; cost $9,500; o, John Affleck and Annie M. Stalker; b, J. A. T. Vaunpet and T. Kepple....117 Lawrence st, e s, 100 n Willoughby st, br store and dwel, cost $8,000; o, Frederick Aldridge; a, J. Mumford; b, J. H. Stevenson and Morris & Selover....Moore st, n s, 100 w Graham av, four fr tens, cost ea $7,000; o, a and b, Bush & Wandell ....Hooper st, n s, abt 150 w Lee av, four br stone dwels; cost $5,000; o, Geo. F. Simpson; a, E. F. Gaylor....Jefferson st, s s, 340 e Nostrand av, four br stone dwels; cost ea $8,500; o, Harmon Phillips; as John G. Prague.

ALTERATIONS, BROOKLYN.

248 Cumberland st, br extension, cost $3,000; o and b, John Gordon; a, R. Dixon.

BALTIMORE, MD.—Portland st, s s, br build; o, Chas. M. Kreamer... Mount st, e s, br build and stable; o, Ann Moran ...Sharp st, e s, warehouse; o, And. M. Crury; b, J. Hog....Eutaw st, w s, retort; o, Ed. Brannan....Race st, w s, br build; o, A. L. Thompson....287 Dallas st, e s, br build; o, C. Kogelschats....91, 93, 95, 97 Camden st, n s, 4 br warehouses; o, Samuel Ready; b, Hopkins & Marshall... Chester st, w s, 2 br builds; o, W. H. Binion; b, Hopkins & Marshall....Cross, s w cor Chestnut st, warehouse; o, David Wilson. ..785 Balto st s s, br build; o, Hy. Hartman. . State st, e s, 2 br build; o, Rossner Bros....Chester st, e s, 2 br build; o, Mary Hagertey....Bank st, n s, br build; o, F. McCann ....Broadway cor Barns st, br build; o, V. J. Shemick....35 Walnut st, br build; o, Wm. J. Kirk....Ringold st, e s. br build; o, Wm. H. Russell....57½ St. Paul st, e s, br build; o, St. Elizabeth Home....Penn av, e s, br build; o, R. M. Smith ...Hollins st, w s, 12 br build; o, Jacob Saum ...Monument st, rear of 77, br build for conservatory and art gallery; o, J. W. Garret; b, Jno. E. Marshall....Block st, n s, br build; o, A. V. Mulholland... South, cor Second st, br and st build; o, Firemen's Ins. Co.; b, J. F. Adams....Lombard, cor Dallas st, br build; o, Jno. Councilman ...Monro, cor Ransy st, br parsonage; o, Monroe st M. E. Church....82 Chew st. n s, br build; o, P. Bankard....McMechin st, s s, 2 br build; o, M. Ryan... Hoffman st, s s, 6 br build; o and b, C. H. Callis....Robert st, s s, 7 br build; o, Sheep Butch. Asso ...Division cor Robert st, br build: o, Sheep Butch. Asso. ....Durst st, w s, 2 br build; o, F. Blank.

BOSTON, MASS.—Gilbert st, near Hoffman, fr dwel; o, Annie M. Hall b, Robert O. Ward....Storey Place, opp Greenough ave, fr dwel; o, Edwin Sherwin; b. Wm. H. Stewart....Roslin ave, opp Albans st, fr dwel; o, Emil Frykstand; b, Alex. Rogers....Sargent st. fr dwel; o, Michael Gately; b, Thos. J. Tobin....Hyde Park st, east of Richards ave, fr dwel; o; A. K. Courtland; b, Melvin Dayers....Randlet Place, near Rand st, fr dwel; o, Albert Ward; b, Decker Bros....538 E 7th st, fr church; o. Phillips Church Society; b, Holbrook & Harlow....Pratt st, near Linden st, fr dwel; o, John Keegan, Jr; b, Samuel Beal....Bellevue ave, near Dudley st, fr dwel; o and b, Edward Callahan....87 E 4th st, fr dwel; o, Fannie E. Stetson; b, B. A. Burry ...279 Dorchester ave, fr mercantile build; o, Christopher Budd; b, J. H. Dunn....27 Greenville st, fr dwel; o and b, Wm. Barton....Nelson st. near Norfolk st, fr dwel; o and b, John F. Brown....12 and 14 Wood st, two fr dwels; o, Francis B. Austin; b, E. W. Archer....8 George st, fr dwel and store; o, M. Kaiser; b, Geo. T. Penny. .. P, cor E 6th st, fr store; o, Lydia W. Lincoln; b, W. M. Henderson ....128 I st, fr dwel; o and b, Lyman Locke....128 South st, br mercantile build; o, F. M. and A. S. Frost; b, M. S. and G. W. Miller....6 Norfolk Place, br mercantile build; o, Samuel S. Campbell; b, E. Whitmore....Warren st, cor Rockland st, two br dwels; o, George Heinman; b, A. D. Gould....Warren st, cor Rockland st, fr dwel; o, Charles F. Worthington; b, A. D. Gould. ....Unnamed st, from H st, three br dwels; o, Henry Souther; b, Wm. T. Eaton 344 Newbury st, br dwel; o, Steven E. Westcott; b, G. W. Pope....105 and 107 W 7th st, wood dwel and store; o, Sarah O'Mally; b, Isaac S. H. Dunn....Dock ave, near Greenwich ave, fr dwel; o, Patrick and Michael Finnegan; b, Mich. Ryan....Mayfair st, near Bainbridge st, fr dwel; o, Thomas J. Thomas; b, Charles H. Blodgett....260 Eagle st, fr dwel; o, J. W. Simpson; b, J. Emroe....Dock ave, cor Alger st, dwel and store; o, Alfred T. Armstrong....82 Rutheford ave, fr dwel, John Donovan; b, Ed. J. Tully... Tremont st, near Whitney pl, fr dwel; o, Patrick Daley; b, J. Donnelly.. 40 B. Hill ave, fr dwel; o, Leander B. Abbott; b, same....180 Commonwealth st, two br dwels; o, Leander B. Abbott; b, same ...387 and 389 Summer st, two fr dwels; o, Eliza Moore; b, Herman Drake.

BRIDGEPORT, OHIO.—Br store; cost $8,000; o, D. Heinlein; a, S. M. Howard; b, C. Stagger.

CHICAGO, ILL.—2,829 Prairie av, br dwel; cost $12,000; o, Mr. Palmer; a, Palmer; b, not let....269 Superior st, br flats; cost $8,000; o, Jno. Mountain....Astor st nr Scott; br dwel; cost $6,000; o, W. E. Kimball....598 N Clark st, br flats; cost $7,000; o, Wm. Griffiths....2,523 Michigan av, br and st dwel; cost $30,000; o, J. H. Swan; a, Treat & Foltz; b, A. Beemott and others....201 Burling st, br dwel; cost $5,000; o, A. Neumann....2,343 Michigan av, br dwel; cost $12,000; o, Wm. Parsons; a, Cobb & Frost; b, W. A. & A. E. Wells....682-684 Indiana st, br dwel; cost $12,000; o, Q. Franks....Center av and W Ohio; br flats; cost $10,000; o, Tobias Samuelson a, Hallberg....700 Noble st, br dwel; cost $5,000; o, Frank Oken....11 Michigan av, br store; cost $5,000; o, Wm. Hoyt & Co.; a, W. R. Preston; b, W. R. Preston ....Franklyn and Ontario sts, br store and dwel; cost $20,000; o, Jno. A. Lind; a, T. V. Wadskier; b, not let....La Salle av and White st, br dwel; cost $15,000; Hamill & Congdon; a, Cobb & Frost; b, J. W. Castle & L. Weick....N State and Illinois sts; remodeling of br dwel with st and flats; cost $12,000; o, Johnson Estate; a, Cobb & Frost; b, T. G. Goodfellow....Garfield Park, modern casino in fr; cost $15,000; o, the city; a, Burnham & Root....30th and Vernon av, br stable; cost $5,000; o, Willard F. Myrick; a, Cobb & Frost; b, Wm. Crace.

CINCINNATI, O.—Cor Milton & Vaughan sts, br; cost $8,000; o and b, Aug. Goeser. Crown nr May, br; cost $7,000; o, Mr. Arnold; b, Wm. Goldkamp..5th nr Vine st, br; cost $6,000; o, T. D. Jones; b, W. Cordlemand & Sons..Queen City av nr Harrison, br; cost $5,000; o, J. Armbruster; b, J. P. Schar....Freeman nr Wade, br; cost $25,000; o, Turner Hall Co.; b, M. B. Stanfield.

KANSAS CITY.—1,028 Locust st, br dwel; cost $5,000; o, Chas Stewart....210 W 5th st, br st; cost $5,500; o, C. J. Huoni.

MILWAUKEE, WIS.—Modern house, br, st and fr; cost $16,000; o, the Rev. J. N. Freeman; a, Cobb & Frost; b, Clark & Fuller, of Chicago.

PHILADELPHIA, PA.—Hill and Amber st, 6 dwel; b, McCutchon Bros. ... Somerset & Reese st, dwel; b, D. Newling... Islington av nr Burks st, 18 dwel; o, Jas. Caven....Main & School lane, savings fund bldg; b, J. D. Caldwell ..Cottage lane & Thorpe lane, dwel; b, J. D. Caldwell ...Mt. Vernon n of Division st, 4 dwel; o, Jas. Hinchliff....Broad & Hamilton st, machine shop; b, Kister & Orem....Church w of Trenton R. R., 2 dwel; b, Jas. McCartney ...Oxford st w of 25th st, 7 dwel; b, J. L. Carre....Spruce & Bradford st, 3 dwel; o, J. McClennan....Woodland av w of 32d st 3 dwel; b, J. E. & A. L. Pennock... Lancaster av w of 32d st, 3 dwel; b, J. E. & A. L. Pennock....42 st & Belmont av, 4 story add to Colored Home; b, same as last....S w cor Division & Jefferson st. dwel; o, John McQuade....802-804 Dauphin st, 2 dwel; b, Alex. Ligget....226 N 8th st, dwel; b, E. M. Daniels....705 N 3d st, dwel; b, John Berner....Ogle n of Fountain st, 5 dwel; b, Chas. Bartle....43d s of Eadline st, 4 dwel; b, Louis C. Smith ....Cherrie cor Margaretta st, dwel; b, A. H. Taylor....Frankford Rd & Actlane av, 4 dwel; b, A. H. Taylor. Oxford e of 22d st, 4 dwel, b, W Hollaway .. 22d s of Oxford st, 3 dwel; b, same as last....1368 Edgemont st, 3 dwel; b, same as last....Poplar w of 27th st, 2 dwel; o, Jacob Rainer ...Pine & Franklin st, 4 dwel; o, A. Main. . 18th st n of Columbia av, dwel; b, J. Culberton.... 10th cor Wallace st, church bldg; b, George F. Payne....1210 South st, store & dwel; b, Grubb Bros.....Ripka w of Washington av, dwel; b. W. R. Davis ...Willington & Montgomery av, 5 dwel; b, Thos. McCouch....Moll bet Wharton av, 10 dwel; o, David Garrison....Washington & Ripka av, dwel; b, W. Goodfellow....5th n of Cumberland st, dwel; o, Saml. Mills....3060 Norris cor Belgrade st, 4 dwel; b, Duryea & Childs.

ROCHESTER, N. Y.—Gorham st, 4 br apart house; cost $10,000; o, B. Hahn; a, Oscar Knebel .. Sheridan pk, fr dwel; cost $5,000; o, B. Hugel; b, J. Stephany....S St Paul st; add to new Osburn House; cost $20,000; o, N. Osburn; b, N. Osburn.

SOUTH EVANSTON, ILL.—Fr church; cost $7,000; o, Methodist Church; a, Cleveland & Fay.

WASHINGTON, D. C.—Mass av and 17th st; br; cost $11,000; o, Holtzclaw Bros....Mass av bet 13th and 14th sts; br; cost $7,500; o, Saml Kerr; a, J. Germuller; b, J. W. Reed. A large number of permits for small houses have been issued, but the work on large buildings has been temporarily stopped in consequence of the advance in price of labor and material.

WHEELING, W. VA.—Market st, br store; cost $6,000; o, McGarrett; b, L. O'Brien....Main st, br res and store; cost $7,000; o, L. Pracht; b, Klieves. Kraft & Co....18th st and Eoff st, br parsonage; cost $5,000; o, Lutheran Church; a, Harting & Co....McCullough st, br add and alter; cost $6,000; o, Central Glass Co.; b, Company... 45th st nr Eoff, br church; cost $12,000; o, Presbyterian Church; a, S. M. Howard; b, G. Arkle, st contractor.

MISCELLANEOUS.

BROOKLYN, N. Y.—The Board of Supervisors of Kings County, the 17th inst., passed resolutions directing the committee on county farm to consider the selection of a tract of 50 to 100 acres on which a new asylum for the insane may be built.

CHICAGO, ILL.—Theodore G. Springer has had plans made for a four story apartment house, at Division street and Lasalle av, cost $18,000. An apartment house house costing $16,000 will be built for J. F. Walch, by John Otrer, architect; also a three story residence for D. Donegan, cost $30,000, and four flats for C. P. Holmberg and Blomgren Bros., of brick, costing $40,000.

CHARLOTTE, MICH., will have a county court house costing $75,000.

GRAND RAPIDS, MICH.—The Y. M. C. A. intend to put up a building on property recently bought.

RACINE, WIS.—A large stone church is begun for the Roman Catholic denomination.

The highest building in New York, perhaps in this country, is to be built on the northwest corner of 57th st and 7th av. The owner is Mr. Thomas Osborn, and the architect Mr. J. E. Ware. The proposed structure will be 150 x 94 in size, 200 feet high from the tower to the ground, and will be entirely fire-proof. It will be used as an apartment house, and will accommodate 38 families. The cost will exceed $650,000.

BOOKS RECEIVED.

BOWER SEWER GAS TRAP. B. P. Bower & Co., Cleveland Ohio.

WATER RATES, WATER STATISTICS, AND WATER METERS IN USE, as compiled from Official Returns of 250 cities and towns. The National Meter Company, N. J.

REGULATIONS FOR LIGHTING BRIDGES OVER NAVIGABLE RIVERS, April 1883. United States Light House Establishment.

AMERICAN COTTAGES. Forty-four large quarto plates, containing original designs of medium and low-priced cottages, together with a form of specification for cottages. New York. William Comstock.

INDUSTRIAL EDUCATION IN THE UNITED STATES. A special report prepared by the U. S. Bureau of Education. Washington, Government Printing Office.

ALKALI ACTS—1863 and 1874—EIGHTEENTH ANNUAL REPORT BY THE INSPECTOR, OF HIS PROCEEDINGS, during the year 1881. London. George E. B. Eyre, and William Spottiswode, 1883.

Cincinnati is clamoring for a Health Commissioner, and among the names mentioned for this position, instead of the abolished board of health, are those of Wm. Clendenin, M.D., T. C. Minor, M.D., T. H. Kearney, M.D., and A. B. Thrasher, M.D. John H. Rendigs, M.D., is a candidate.

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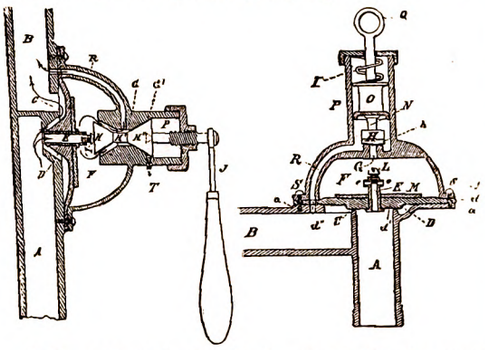
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

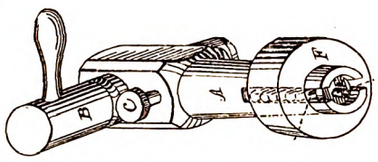
269,886. COCK. JAMES SEMPLE. Cincinnati, Ohio. Filed Mar. 28, 1882. (No model.) Issued Jan. 2, 1883.



Claim.—1. In combination with the main valve D and a controlling-valve, the regulating-duct E, adjustable in its delivery by means of plug L, substantially as and for the purpose designated.

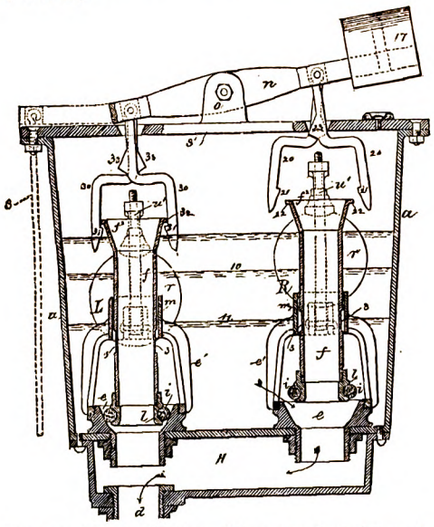
2. In the described combination with main opening C and its valve D, and with the duct E in said valve, adjustable in its delivery by means of plug L, the double conical controlling-valve H H^1 H^{11} in the corresponding double-seated chamber P, with wasteway T, substantially as set forth.

269,912. FAUCET. JOHN L. BERRY and SHADRACK GLADNEY, Antelope, Cal. Filed July 20, 1882. (No model.) Issued Jan. 2, 1883.



Claim.—A spigot provided with slotted pipe A and a supplemental opening, and a tube and float adapted to communicate with the interior of the vessel above the liquid, in combination with the elastic retaining-band F to hold the tube and float within the slotted pipe A, as set forth.

269,921. CISTERN FOR WATER-CLOSETS. JOHN DEMAREST, New York, N. Y. Filed Aug. 21, 1882. (No model.) Issued Jan. 2, 1883.



Claim.—1. The combination, with a water-closet cistern, of two valves, mechanism for raising such valves, floats, and levers for holding up such valves and for allowing the same to drop automatically when the water in the cistern descends to the two different levels, substantially as set forth.

2. The combination, with the cistern-valve, of a stem having a neck, a guide for such stem, a float, and a lever having a pawl to engage such stem and support the valve, substantially as set forth.

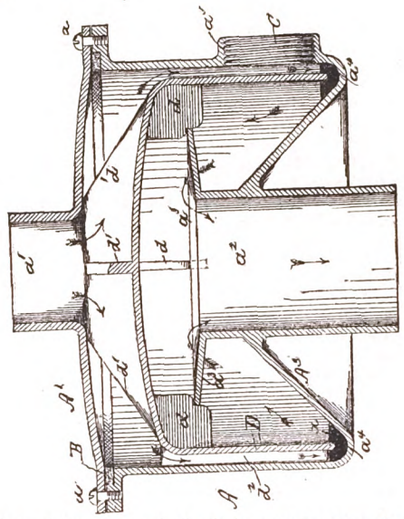
3. The combination, in a water-closet cistern, of two valves, two floats, and means for holding up the valves and for allowing the valves to drop automatically at different levels of the water, a lever and weight and catches on the lever at opposite sides of its fulcrum for alternately raising the valves, and means for disconnecting the catches, substantially as set forth.

4. The combination, with the water-closet cistern, of a valve, a stem, a guide for the stem, latches for lifting the valve and stem, a float, lever and pawl for holding up the valve and for allowing it to drop automatically, substantially as specified.

5. The combination of the water-closet cistern and the valve, the tubular stem to the valve having an open flaring upper end, for the purposes set forth.

270,084. MERCURY SEAL-JOINT TRAP FOR BATH TUBS, ETC. ABRAHAM EDWARDS, Asbury Park, N. J., and SAMUEL J. VAN STAVOREN, Philadelphia, Pa., assignors to said Edwards. Filed May 22, 1882. (No model.) Issued January 2 1883.

Claim.—1. A stench-trap composed of a body having lateral cleaning out opening and an eduction pipe, a top or cover for said body, having an induction pipe, and an inverted cup suspended within said body between the induction and eduction pipes, and provided with external vertical ribs or scrapers, substantially as shown and described.



2. A stench-trap composed of a body, a top or cover therefor, a cleaning out opening, eduction and induction pipes, and an inverted cup suspended between said pipes and adapted to be rotated to effect a cleansing of the trap, substantially as shown and described

3. The combination of body A, top A^1, and inverted cup D, the body A having lateral or cleaning out opening a^6, provided with the removable stopple C, mercury holding groove or trough a^4, eduction pipe a^2, flanged at a^3, and the top A^1, having induction pipe a^1, substantially as shown and described.

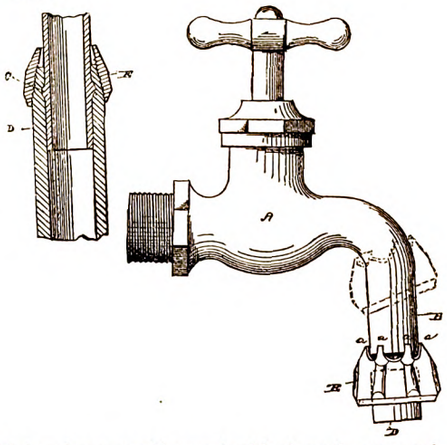
4. The combination of body A, having lateral opening a^6, provided with stopple C, mercury holding trough or groove a^4, and eduction pipe a^2, the top or cover A^1, having induction pipe a^1, and the inverted cup D, suspended between said induction and eduction pipes, and provided with vertical ribs d^2, substantially as shown and described.

5. A stench-trap composed of a top, with induction pipe, a body having eduction pipe, and a trough or groove with a mercury seal, and an inverted cup between said pipes, the lower edge of the cup dipping into said sealing medium, and said cup being of such size or diameter that the horizontal area or width of the space between the cup and the body of the trap is less than the width or extent of the mercury or sealing medium in said groove or trough, substantially as shown and described.

6. In a stench-trap, the combination, with a body having an eduction pipe and a top therefor, having an induction pipe, of an inverted cup between said eduction and induction pipes, adapted to be rotated on its bearings to cleanse the wall or sides of the trap, substantially as shown and described.

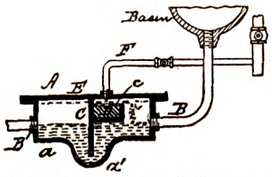
7. The stench trap herein shown and described, provided with cup D, having external vertical ribs, d^2, substantially as set forth.

270,066. COCK AND FAUCET. FRANCIS HICKMAN, New York, N. Y. Filed April 19, 1882. (No model.) Issued January 2, 1883.



Claim.—As a new and improved article of manufacture, a cock or faucet having a bead or shoulder on its nozzle, in combination with a coupling ring of flaring form having a screw thread in it, substantially as described.

270,111. TRAP FOR WASH STANDS, etc. CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas, Co., Camden, N. J. Filed July 31, 1882. (No model.) Issued Jan. 2, 1883.



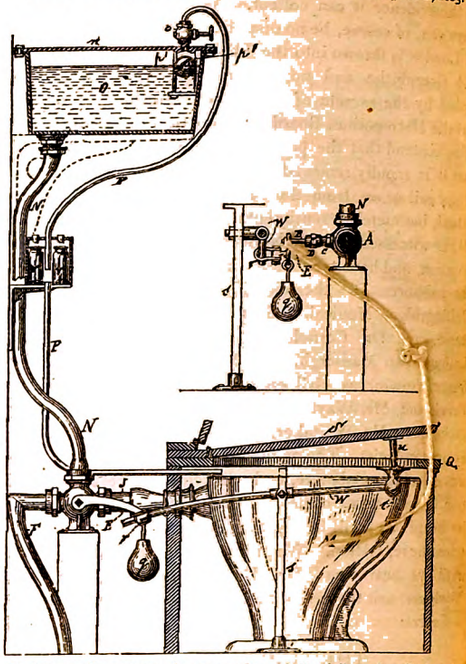
Claim.—1. A stench trap for wash basins, etc., provided with a pipe connected to the water supply pipe of such fixtures, whereby a continuous flow of water is conducted into said trap, in combination with means for regulating the volume of such flow, substantially as set forth.

2. A stench trap for wash basins, etc., provided with a disinfectant-containing pocket, and a pipe leading thereto and connected with the water supply pipe of such fixtures, whereby a continuous flow of water is passed to said pocket to provide a running disinfectant seal for said trap, substantially as set forth.

3. The trap A, having induction pipe B, eduction pipe B^1, partition C, and curved bottom a^1, in combination with a water supply pipe, F, substantially as shown and described.

4. The trap A, having induction pipe B, eduction pipe B^1, partition C, curved bottom a^1, and pocket D, in combination with a water supply pipe F, substantially as shown and described.

270,080. WATER CLOSET. JOHN KELLY, Chicago, Ill., assignor of two-thirds to Thomas Kelly and James Kelly, same place. Filed June 28, 1882. (No model.) Issued Jan. 2, 1883.



Claim.—1. In a water closet, a valve substantially as described, and connected by pipe N with the service tank O, such tank having stop valve *o*, float valve *p*, and air escape pipe P, the whole to oper. te substanstantially in the manner herein set forth.

2. In a water closet, a valve substantially as described, and connected by pipe N with the service tank O, such tank having float valve *p*, and air escape pipe P, that is interposed by a chamber T, containing disinfecting material, all substantially as and for the purpose described and shown.

269,656. STEAM-TRAP. ARTHUR L. FISH, San Francisco, Cal. Filed Oct. 19, 1882. (No model.) Issued Dec. 26, 1882.

269,676. PORTABLE PUMP. WILLIAM J. JOHNSON, Newton, and FRANK C. JOHNSON, Boston, Mass.; said Wm. J. Johnson assignor to the National Manufacturing Company, Worcester, Mass. Filed March 23, 1882. (No model.) Issued Dec. 26, 1882.

269,690. BOILER AND FURNACE. JAMES H. MACKINTOSH, Paterson, N. J. Filed April 26, 1882. (No model.) Issued Dec. 26, 1882.

269,720. FURNACE. CLAUS RUSSMANN, Hamburg, Germany. Filed Oct. 5, 1882. (No model.) Issued Dec. 26, 1882.

269,757. INCANDESCENT-ELECTRIC-LAMP HOLDER. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed Aug. 23, 1882. (No model.) Issued Dec. 26, 1882.

269,759. ELECTRIC INCANDESCENT LAMP. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed Dec. 13, 1881. Renewed Sept. 13, 1882. (No model.) Issued Dec. 26, 1882.

269,761. DYNAMO-ELECTRIC MACHINE. EDWARD WESTON, Newark, N. J., assignor to the United States Electric Lighting Company, New York, N. Y. Filed Sept. 13, 1882. (No model.) Issued Dec. 26, 1882.

269,768. TUBULAR DRILL FOR BORING ARTESIAN WELLS. JAMES P. WINTZ, Charleston, W. Va. Filed Nov. 4, 1882. (No model.) Issued Dec. 26, 1882.

269,798. GAS-GENERATOR. JAMES E. LEADLEY, Camden, N. J., and JOHN HANLON, New York, N. Y., assignors to the United Gas Improvement Company, Philadelphia, Pa. Filed July 12, 1882. (No model.) Issued Dec. 26, 1882.

269,805. REGULATOR FOR DYNAMO-ELECTRIC MACHINES. HIRAM S. MAXIM, Paris, France. Filed Aug. 31, 1882. (No model.) Issued Dec. 26, 1882.

269,807. INSULATING-WIRES. LEWIS H. MCCULLOUGH, Richmond, Ind. Filed July 21, 1882. (No model.) Issued Dec. 26, 1882.

269,813. GAS-ENGINE. LEWIS C. PARKER, Robinson, Kansas. Filed Aug. 29, 1882. (No model.) Issued Dec. 26, 1882.

269,827. AUTOMATIC SAFETY ATTACHMENT FOR STEAM-BOILERS. CHARLIE CASE, Emlenton, Pa. Filed Aug. 2, 1882. (No model.) Issued Jan. 2, 1883.

269,833 and 269,834. VAPOR-BURNER. ZEBULON DAVIS, Canton, Ohio. Filed Feb. 18, 1882. (No model.) Issued Jan. 2, 1883.

269,849. COMPOUND FOR THE MANUFACTURE OF ARTIFICIAL STONE. JOSEPH A. GREER, Galveston, Texas. Filed July 3, 1882. (No specimens.) Issued Jan. 2, 1883.

269,868. ELECTRIC WIRE-CABLE. JAMES MACKINTOSH, Philadelphia, Pa. Filed June 16, 1882. (No model.) Issued Jan. 2, 1883.

269,878. HEATING-FURNACE. HENRY W. MICHAEL, Denver, Colo. Filed Apr. 13, 1882. (No model.) Issued Jan. 2, 1883.

269,888. ELECTRIC MOTOR. WILLIAM L. SILVEY, Castleton, Ind. Filed Mar. 18, 1882. (No model.) Issued Jan. 2, 1883.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MAY 12th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of—	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs.	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal diseases.	Small-pox.	Whooping cough
NORTH ATLANTIC CITIES.																							
Portland.....Maine	34,519	12	18.0	4	33.3			5	1								1						
Boston.....Mass	407,581	225	28.7	69	30.6	7	1	25	3	8	12	1	5		3	28		13		10	3		
Cambridge.....Mass	57,432	17	15.4	7	41.2			3			3					2							
Worcester.....Mass	64,995	24	19.2	5	20.8			6			1					5	1	1			1		
Fall River.....Mass	60,126	18	15.5	6	33.3	1		2					1			2							
New Haven.....Conn	66,979	25	19.4	5	20.0			4				1			1	1		1					1
Providence.....R. I.	116,755	51	22.7	9	17.6	3		11	1	1	2					6		2			2		
Total	808,387	372	24.0	105	28.2	11	1	56	5	9	18	2	6		4	44	2	17		10	6		1
EASTERN CITIES.																							
Albany.....New York	98,430	31	16.3	13	41.9	2		4					1		2	5	1						
New York.....New York	1,299,249	668	26.7	245	36.6	27	9	91	3	18	21	5	2	14	32	97		28		23	12		3
Brooklyn.....New York	633,763	235	19.3	73	31.1	9		43		5	3	1	1	3	13	17	2	5	3	1	2		4
Hudson Co.....New Jersey	228,025	78	17.8	34	43.5	3	3	7	3	2	1		2	2	1	6		6			3		
*Newark.....New Jersey																							
*Camden.....New Jersey																							
Paterson.....New Jersey	58,324	24	21.4	6	25.0			6	1					1	2	1							
Philadelphia.....Pa.	907,043	354	20.3	113	31.9	7	1	48	10		12		5	3	12	28	4	12	2	5		3	
*Reading.....Pa.																							
Wilmington.....Delaware	46,889	18	19.9	3	18.6		1	3					1			2	1	1				2	
Total	3,271,723	1,408	22.4	487	34.5	48	14	202	17	25	37	6	12	23	62	156	8	52	5	29	17	5	7
LAKE CITIES.																							
Buffalo.....New York	168,702	64	19.7	25	39.0	2		11	1						5	3	4						
Rochester.....New York	92,116	45	25.4	10	22.2	2	1	6					1	2				1					
*Syracuse.....New York																							
Cleveland.....Ohio	192,084	70	18.9			2		6	2	1	2	1	4	1	1	7	1				1		1
Detroit.....Michigan	131,118	44	17.4	16	36.3			4	3		6				1	4		2					
Chicago.....Illinois	597,834	182	15.8	82	35.1	8	1	20	3	6	11	3	2		7	16	1	8		1	2	1	3
Milwaukee.....Wisconsin	135,233	57	21.9	37	64.9	1	2	4	1	2	4		1		3	3	1						
Total	1,317,087	462	18.2	170	36.7	15	4	51	10	9	23	4	8	3	17	33	7	11		1	3	1	4
RIVER CITIES.																							
*Allegheny.....Pa.																							
Pittsburgh.....Pa.	191,523	44	11.9	12	27.2	5		3		1	1		2			6		1			3		
Cincinnati.....Ohio	267,767	107	20.7	40	37.3	7	1	12	2	3	2	1	1		5	8		5		2	3		
Dayton.....Ohio	41,648	10	12.5	4	40.0			2					1									1	
*Louisville.....Ky.																							
Evansville.....Ind.	32,028	20	32.3	5	25.0	1	1	4					1	1								6	
Indianapolis.....Indiana	86,529	30	18.0	16	53.3	1	1	3					1					2		1		1	1
*Terre Haute.....Indiana																							
Minneapolis.....Minn	98,026	28	14.5	13	46.4	1	1	6		3	3					5							
*St. Paul.....Minn																							
*St. Louis.....Mo.																							
Total	717,521	239	17.3	90	37.6	15	4	30	2	7	6	1	6	1	5	19		8		3	6	8	1
PACIFIC CITIES.																							
*San Francisco.....Cal.																							
SOUTHERN CITIES.																							
District of Columbia.. ..... Wh.	136,471	46	17.5	11	24.4	2		8					1	1	2	3	1						
" " ..... Col.	71,103	38	27.8	18	47.3	1		9	1					1	3	3		3	2				1
Richmond, ... Va. Wh.	39,582	9	11.8	5	55.5											1		1		1			
" ..... Col.	31,363	23	38.1	11			1	4	1	1	1					1					1		2
Charleston ..... S. C. Wh.	22,699	8	18.3	2	25.0					2						2		1					
" ..... Col.	27,595	21	39.6	9	42.8			3		1						2		1	1				
Atlanta..... Ga. Wh.	25,583	12	24.4	6	50.0			1		5													
" ..... Col.	19,221	17	46.0	8	47.0		1	4		4						2							
*Savannah..... Ga. Wh.																							
" ..... Col.																							
Nashville..... Tenn. Wh.	31,993	13	21.1	5	38.4			3								1						1	
" ..... Col.	19,406	14	37.5	6	42.8			3		1						2	1			1	1		
Memphis ..... Tenn. Wh.	18,677	6	16.7			1		1					1			1							
" ..... Col.	14,896	15	52.1	6	40.4	1		1		1				2							1		1
*Mobile..... Ala. Wh.																							
" ..... Col.																							
New Orleans..... La. Wh.	163,757	79	25.1	25	31.6	3		12		9				4		2						13	
" " ..... Col.	59,866	65	56.2	20	30.7	2		6	1	8		1		1		3		2	1	1		17	
Total White	438,762	173	20.5	54	31.2	6		25		16			2	5	2	10	1	2		1		14	
Total Colored	243,450	193	41.2	78	40.4	4	2	30	3	16	1	1		4	3	13	1	6	4	2	3	17	4
Total in 32 U. S. Cities	6,796,930	2,847	21.7	984	34.5	99	25	394	37	82	85	14	34	36	93	275	19	96	9	46	35	45	17
April 28—Total in 28 English Cities	8,620,975	3,758	22.7			121				43	23		53		61					67		9	89
April 28, " 8 Scotch Cities	1,233,088	655	27.6			12				8	12		8		7	119				32			38
April 28, " 16 Irish Cities	854,731	464	28.2			3		75		9			3		2	121				3			16
April 14, " 170 German Cities	8,697,774	4,637	27.7	2012	43.4	107		707	29	203	130		48		54	731				75	27	5	57

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made.

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

Notes and Abstracts.

Of an urban population of 6,796,930, there died, during the week ending May 12, 2,847 persons, which is equivalent to an annual death rate of 21.7 per 1,000; a slight decrease from that of the preceding week, viz., 22.0.

For the North Atlantic cities the rate was 24.0; for the Eastern cities, 22.4; for the lake cities, 18.2; for the river cities, 17.3; and in the Southern cities, for the whites, 20.5, and for the colored 41.2 per 1,000.

Of the whole number of deaths, 34.5 per cent. were under five years of age.

Accidents caused 3.4 per cent. of all deaths. Consumption caused 13.8 per cent. of all deaths. In the North Atlantic cities it caused 15.0; in the Eastern cities 14.4; in the lake cities 11.0; in the river cities 12.5, and in the Southern cities, for whites, 14.4, and for colored 15.5 per cent.

Croup caused 1.2, diarrhœal diseases 2.8, and diphtheria 2.9 per cent. of all deaths. In the Southern cities diarrhœal diseases caused 9.2 per cent. of all deaths among the whites, and 8.2 per cent. among the colored. In the North Atlantic cities diphtheria caused 4.8, in the Eastern cities 2.6, in the lake cities 4.9, and in the river cities 2.5 per cent. of all deaths.

Typhoid fever caused 1.1, malarial fevers 1.2, and scarlet fever 3.2 per cent. of all deaths. The highest rate from typhoid was in the river cities (2.5). The highest rate from scarlet fever was in the Eastern cities (4.4).

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TABLE SHOWING DEATHS IN TWENTY-SEVEN CITIES OF THE UNITED STATES FOR THE MONTH OF MARCH, 1882.

CITIES.	STATES.	Total Population.	Total Number of Deaths.	Representing an Annual Death rate per 1,000 of—	Number of Deaths under Five years.	Number of Deaths over Sixty years.	Males.	Females.	Accidents.	Cerebro-Spinal Meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	FEVER. Typhoid.	FEVER. Malarial.	FEVER. Scarlet.	ACUTE LUNG DISEASES. Pneumonia.	ACUTE LUNG DISEASES. Congestion of Lungs	ACUTE LUNG DISEASES. Bronchitis, acute.	ACUTE LUNG DISEASES. Pleurisy.	Measles.	Puerperal Diseases.	Small-Pox.	Whooping-Cough.
Burlington	Iowa	27,000	32	13.92	5	3	14	18			6					3		1					1	1		
Chicago	Ill	560,693	968	20 72	483	100	534	434	55	7	94	17	21	49	11	17	7	35	73	13	52	3	4	20	9	10
Detroit	Mich	130,000	246	22.48	158	72	122	124	1		30	4		20	4	1	4	6	20	4	14	2		3		2
District of Columbia	White	126,300	236	22.42	141	78	112	124	9		49	1	1	7	2	4	4	15	30	4	5	1	1		1	
"	Colored	65,680	196	35.79			89	107	10		43		3	1		4		3	31	3	7	1				2
Evansville	Ind. White	26,565	73	32.88	32	9	61	39	1	1	12		1				6		12		1			2	13	
"	Colored	2,712	27	119.40							2						2		7					1	9	
Hudson Co	N. J	203,681	415	24.40	155	52			26	2	56	13	13	16		5		29	45		16		1	2	1	1
Keokuk	Iowa	15,000	12	9.60	2	2	5	7			3								4				1	1		
Knoxville	Tenn. White	12,643	17	16.13	7	3	8	9		2	2	1				2			3							1
"	Colored	4,508	19	50.75	9		10	9			5					1			5				1		2	
Lansing	Mich	8,319	1	1.42		1		1																		
Macon	Ga. White	9,000	11	14.66	4	3	7	4	2		2								2		2					
"	" Colored	8,000	16	24.00	3	3	7	9			4								1							
Memphis	Tenn. White	18,677	56	35.40	15		35	21	1		9	1	1		1	1	2		6		2					
"	" Colored	14,896	74	58.64	25		41	33	2		17		1				2		16	1	2					
Milwaukee	Wis	130,000	192	17.70	92	27	88	104	3	3	21	4	2	14		3		5	13	2	7	3		2		1
Minneapolis	Minn	80,000	105	15.75	36	10	52	53	9	2	13	1		6	1	4		1	11	2	2			6	3	
Mobile	Ala. White	16,927	45	31 39	18	22	20	25	1		10			1	2		1		2							
"	" Colored	14,368	33	27.14			13	20	2		6		1			1			1	2				1		
Nashville	Tenn. White	32,000	60	22.20	12	15	31	29	8	1	13	1						1	5	1	1		1	2	4	1
"	" Colored	18,000	53	34.9	25		25	28	3		4	1	2						13	1			1		7	
New Haven	Conn	72,000	119	19.80	44	30	57	62	2		15			6			2	1	14		9		7	3		6
Norfolk	Va. White	13,777	28	23.95	14	4	15	13	1		4	1		1			1	1	1		1		5	1		
"	" Colored	12,411	47	44.60	23	6	26	21		2	4	1				1			10				4			
Oakland	Cal	36,000	41	13.66	9	8	26	15	2		8			2					6		1					
Paterson	N. J	55,000	100	21.47	39	20	54	46	2		16		1			3	1	3	15					1		
Providence	R. I	116,755	193	19.83	49	47	101	92	4	1	33	3	4	4	4	11			27	1	5	1	1			2
Richmond	Va. White	40,000	70	21.00	61	27	33	37	3		9					1			4	3	2			1		3
"	" Colored	28,000	79	33.84			36	43	3		14	1	1						9	2	4					2
San Jose	Cal	12,500	15	14.40	4				2		4	1		2				1								
Scranton	Pa	45,850	56	14.64	25	13	32	24	2	1	3		4	4				2	11		3		3	1		
Selma	Ala. White	3,425	6	21.00		1	2	4			1								1				2			
"	" Colored	4,080	10	29.40	3	2	4	6				1											2			
St. Paul	Minn	53,683	111	24.42	53	11	66	45	6	3	16	3	1	8		3			21		5					
Toledo	Ohio	60,000	62	12.15	25	9	28	33	3	2	7	1	2	2		3		1	9	3	3					
Wilmington	Del. White	43,200	63	17.73	33	22			1	1	6		1			1	1	2	7	2	4			3		
"	" Colored	6,800	29	51.02							5					1		2	3	2	2			6		
Total White		1,958,995	3,333	20.06					143	26	442	52	52	142	25	62	29	104	518			10	27	46	34	29
" Colored		179,455	583	38.23					25	2	104	4	8	1		8	4	5	122			1	8	2	24	5
Total in 27 Cities		2,138,450	3,916	21.59					168	28	546	56	60	143	25	70	33	109	640			11	35	48	58	34

Pneumonia caused 9.6, and acute bronchitis 3.3 per cent. of all deaths. In the North Atlantic cities pneumonia caused 11.8; in the Eastern cities 11.0; in the lake cities 7.1; in the river cities 7.9, and in the Southern cities, for the whites 5.7, and for the colored 6.7 per cent.

Measles caused 1.6; small-pox 1.5, and whooping cough 5 per cent. of all deaths. Of the 45 deaths from small-pox reported, 30 occurred in New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 39 new cases of diphtheria, 21 of scarlet fever, and six of typhoid fever.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISLAND.—Dr. Y. M. Franklin reports 1,369 insane patients remaining under treatment at the close of the week ending May 12. The changes during the week were: admissions 15, discharges eight and deaths three.

LYNCHBURG, VA.—Dr. Thomas L. Walker reports the prevalence of a mild form of scarlet fever among the children. Two deaths took place from the disease during the week.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 25 new cases of scarlet fever and eight of diphtheria, making a total of nine of the latter disease and 52 of the former remaining under treatment on May 12.

BALTIMORE, MD.—The Board of Health reports 187 deaths as having occurred during the week ending May 12: Males 94, females 93; under five years, 66, over 60 years, 28. Annual rate per 1,000, white 21.45, colored 37.86. Small-pox caused only one death. Violence caused six deaths, consumption 27, croup two, diarrhœal diseases two, diphtheria 11, typhoid fever one, malarial fevers five, scarlet fever 15, puerperal diseases two, pneumonia 15, bronchitis four, and whooping cough one.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports but one death, from consumption, during the two weeks ending May 12.

DETROIT, MICH.—Dr. O. W. Wight reports 25 new cases of diphtheria and 15 of scarlet fever during the week.

MICHIGAN.—Dr. H. B. Baker reports the diseases prevailing in the State during the week ending May 5 as follows: Rheumatism, bronchitis, intermittent fever, neuralgia, consumption, tonsilitis, measles and influenza. Compared with the average in the preceding six years, measles was considerably more prevalent, and malarial fevers and diphtheria less prevalent in April of this year. During the week diphtheria was reported present at seven places, scarlet fever at 19 places, and measles at 25 places.

HUDSON CO., N. J.—C. J. Rooney's report for the week ending May 5 came too late to be tabulated. There were 87 deaths, 32 of which occurred in children under five years of age. Accidents caused seven deaths, cerebro-spinal meningitis four, consumption 12, croup, one, diphtheria three, erysipelas two, typhoid fever three, scarlet fever five, pneumonia 12, bronchitis six, and puerperal diseases three. No death was recorded from diarrhœal diseases, malarial fevers, pleurisy, congestion of lungs, measles, small-pox or whooping cough.

SAN FRANCISCO, CAL.—During the month of March, there were 449 deaths as compared with 584 in the corresponding month of last year; males 294, females 155; under five years 99, over 60 years 67. Croup caused one death, cerebro-spinal meningitis one, diphtheria five, diarrhœal diseases 13, erysipelas four, typhoid fever seven, malarial fever two, scarlet fever two, consumption 76, bronchitis 14, congestion of lungs eight, pneumonia 58, puerperal fever three, and violence 23.

PROVIDENCE, R. I.—In his report for the month of April, Dr. E. W. Snow notes the very large number of deaths from four principal causes. There were 129 deaths in April, or considerably more than one-half of the whole number of deaths, from the four diseases, consumption, typhoid fever, heart disease and pneumonia. The number (40) from consumption in April was larger than ever before in Providence in any single month, with the exception of January, 1881, when there were 41 deaths. The number from typhoid fever was larger than in any former month except in November last. The number from pneumonia (33) was larger than in any previous month except in January, 1875, when there were 35 deaths, and in January, 1879, when there were 38 deaths. An epidemic of typhoid fever began in October last, declined slowly in November, and almost disappeared in January; but about March 16, another epidemic began which reached its height in about 12 days, after which it rapidly declined. Since November last the localities of 300 cases of typhoid have been systematically examined, the results of which are promised hereafter. In the meantime it is stated that every case of typhoid fever depends for its existence upon some local source of foul air, or perhaps, in some cases, of impure water. "This statement has received a most remarkable but sad confirmation from the examination of some of the best residences in the city, where there have been cases of the disease this spring."

ONTARIO, CANADA.—The *Provincial Bulletin* for the week ending May 5, notes a general increase in zymotic diseases; mumps, measles, diarrhœa, whooping cough, diphtheria and scarlet fever, all appear at least once among the six most prevalent diseases in the sanitary districts. Measles, which for a few weeks has been receding, has again risen to 7.1 of the total. Pneumonia and erysipelas have receded. Cerebro-spinal meningitis reported present last week, shows a tendency to increase.

HAVANA, CUBA.—Dr. D. M. Burgess reports 598 deaths in the city during the month of April. Thirty-two of these were caused by yellow fever, 14 by typhoid fever, two by bilious fever, four by intermittent fever, 14 by pernicious fever, two by small-pox, and 12 by measles.

During the week ending May 4 there were seven deaths from yellow fever, and one from small-pox.

RIO DE JANEIRO, BRAZIL.—During the week ending April 7, there were 114 deaths from yellow fever in the city; those which occurred in the fever hospital are not included in this number. The mortality from all causes during the week is given by Consul-General C. C. Andrews as 407, of which 13 were caused by small-pox, 13 by typhoid fever, three by typhus fever, 15 by pernicious fever, and 34 by pulmonary consumption.

During the week ending April 14, there were 119 deaths from yellow fever, exclusive of those in the Hospital Santa Isabel, in a total mortality of 371. Small-pox caused six deaths, typhoid fever 11, typhus fever one, pernicious fever 11, and consumption 38.

During the month of March 122 persons died of yellow fever in the Santa Isabel Hospital.

PERNAMBUCO, BRAZIL.—Small-pox continues to affect the death rate in this city, but it is *not* regarded as epidemic. Latest advices from Consul H. L. Atherton, dated April 16, report 9.9, and five deaths from this disease during the three preceding weeks.

BUENOS AYRES, ARGENTINE REPUBLIC.—Consul E. L. Baker reports the continued prevalence of small-pox. During the month of March 182 deaths occurred from this disease in total mortality of 699, the population being 300,000. The disease is causing great apprehensions.

ENGLAND.—During the week which ended April 28, the annual rate of mortality in the 28 great towns of England and Wales averaged 22.7 per 1,000. Leicester registered the lowest rate, 16.9, and Oldham the highest, 32.9. No death was referred to any of the principal zymotic diseases in Norwich or in Huddersfield. The 23 deaths from diphtheria in the 28 towns included 20 in London and two in Leeds. Small-pox caused one death in London, three in Leeds, three in Newcastle-upon-Tyne and two in Birmingham.

London.—Births, 2,514; deaths, 1,635. The former were 268 and the latter two below the average numbers in the corresponding weeks of the past ten years. The annual death rate was 21.6. The deaths included one from small-pox, 40 from measles, 17 from scarlet fever, 20 from diphtheria, 35 from whooping cough, one from typhus, ten from typhoid fever, 19 from diarrhœa and dysentery, and 57 from violence. The deaths referred to diseases of the respiratory organs, which had declined from 672 to 474 during the four preceding weeks, further fell to 445, but exceeded the average by 73; 259 were attributed to bronchitis and 123 to pneumonia.

SCOTLAND.—The Registrar-General's return for the week ending April 28, shows the death rate in the eight principal towns to have been 27.6. The lowest rate was given by Aberdeen, 19.5, and the highest by Glasgow, 34.6.

Edinburgh.—Total deaths 89. Rate 19.6. No death was reported from small-pox or scarlet fever. Measles caused one death, diphtheria and typhoid fever two each, diarrhœa three, whooping cough two, acute lung diseases 22 and violence one.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the Registrar-General for the week ending April 28, a summary of which is given in our mortality table.

Dublin.—Births, 186; deaths, 203; equaling the respective annual rates 27.7 and 30.2. No death was registered from small-pox, measles, scarlet fever or diphtheria. Typhus caused three deaths, and typhoid fever one, whooping cough nine, diarrhœa three, consumption 35, acute lung diseases 51 and violence three.

Belfast.—Births, 150; deaths, 104; equal to the rates 36.4 and 25.2. No death was registered from small-pox, measles, diphtheria, typhoid fever or violence. Scarlet fever caused two deaths, typhus one, whooping cough five, diarrhœa three, consumption 18, and acute lung diseases 26.

IRELAND.—During the quarter ending March 31, according to the return of the Registrar-General, there occurred in the four principal

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tary districts 6,614 births and 7,040 deaths, the former equal to an annual rate of 30.1, and the latter to a rate of 32.9. Small-pox caused four deaths, measles 56, scarlet fever 120, typhus 95, whooping cough 258, diphtheria six, typhoid fever 72, diarrhœa and dysentery 142, consumption 849, acute lung diseases 1,981 and violence 98. The death rate was lowest in Sligo, 20.4, and highest in Lurgan, 40.1 per 1,000. Measles prevailed in Lurgan and Armagh, causing death at the annual rate of 4.3 per 1,000 in the former and 6.0 in the latter town.

Dublin. Births, 2,700; deaths, 2,986, equal to the respective ratio 30.9 and 34.2. Measles caused one death, small-pox none, scarlet fever three, typhus fever 56, whooping cough 153, diphtheria one, typhoid fever 46, diarrhœa and dysentery 47, consumption 357, acute lung diseases 824 and violence 54.

Belfast. Births, 1,814; deaths, 1,700, equal to the annual rate 33.9 and 31.8. Small-pox caused three deaths, measles 18, scarlet fever 101, typhus eight, whooping cough 82, diphtheria one, typhoid fever 16, diarrhœa and dysentery 46, consumption 229, acute lung diseases 504 and violence 27.

PARIS, FRANCE.—The Bulletin for the week ending April 25 shows 1,330 deaths to have occurred, being at the annual rate of 30.86 per 1,000. Of the deaths, 700 were of male persons and 630 of female persons; 343 of children under five years and 310 of persons over 60 years of age. Typhoid fever caused 37 deaths, small-pox 12, measles 40, scarlet fever two, whooping cough 16, croup and diphtheria 44, dysentery two, erysipelas six, puerperal infection five, consumption 267, acute bronchitis 32, pneumonia 138 and violence 29.

On April 22 there remained under treatment in the hospitals of the city 134 cases of small-pox, 196 of fever and 37 of diphtheria. The births during the week numbered 1,233.

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Sealed proposals in triplicate, subject to the usual conditions, will be received at this office, until 12 o'clock, noon, on the 31st day of May, 1883, at which time and place they will be opened in presence of bidders, for furnishing and delivering Fuel, Forage and Straw required at *New York City, Willet's Point, N. Y. H.*, and *David's Island, N. Y. H.*, during the fiscal year ending June 30, 1884.

The Government reserves the right to reject any or all proposals, or to accept as may be most advantageous to the Department.

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Envelopes containing proposals should be marked:—"Proposals for Fuel, Forage and Straw," and be addressed to the undersigned.
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GOVERNOR'S ISLAND, N. Y. H., *May* 11, 1883.

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One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising a part of it.

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Envelopes containing proposals should be marked "Proposals for construction of Post Hospital," and addressed to the Chief Quartermaster, Department of the East, Governor's Island, N. Y. H.

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For the erection of a soldiers' monument until August 1st. Address S. E. Merwin, New Haven, Conn.

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Proposals will be received at the office of the Superintendent of the Institution for the Deaf and Dumb, at Columbus, O., till 8 o'clock, A.M., of Saturday, June 9, for the following work: For reconstructing the heating apparatus now in use; for constructing new cold air ducts; for completing ventilating or foul air ducts.

Proposals will be received until 12 o'clock Wednesday, June 6, 1883, for furnishing and laying about 90,000 feet pipe, assorted sizes, also fittings, hydrants and valves; also pumping machinery, water wheel, etc., also for stone building. Specifications can be had of
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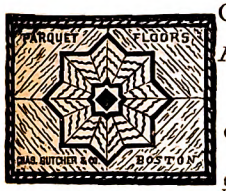

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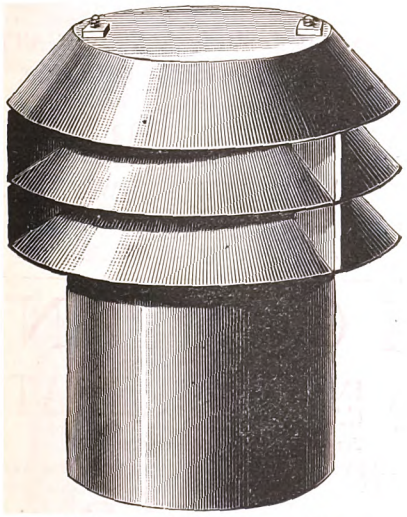

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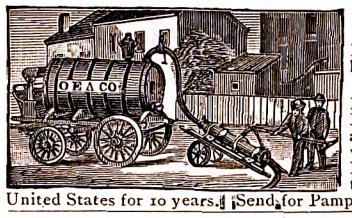

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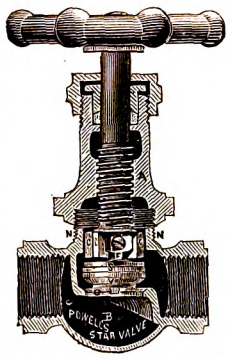

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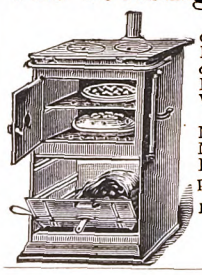

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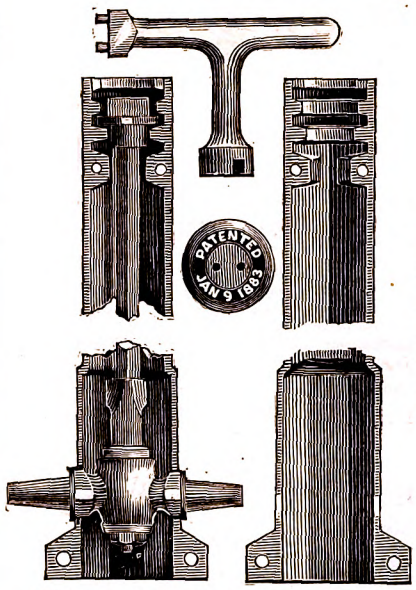

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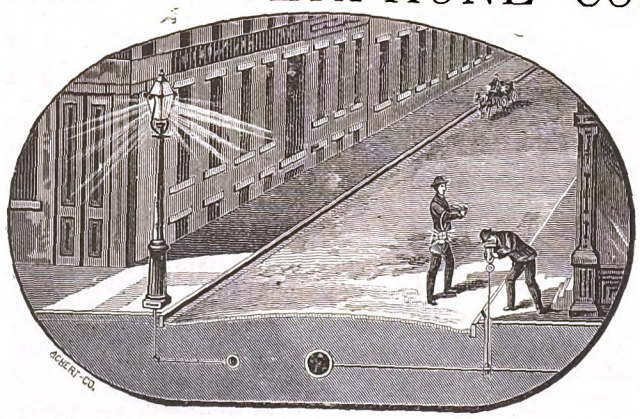

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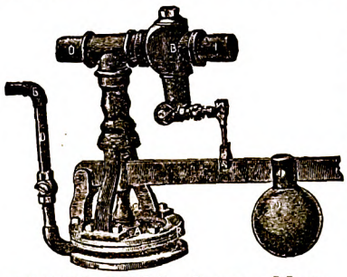

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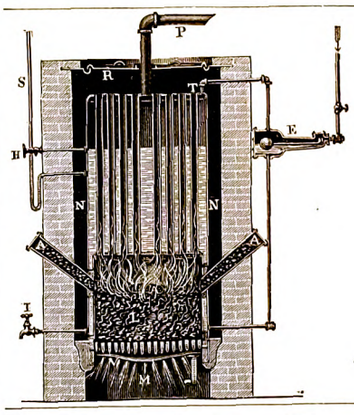

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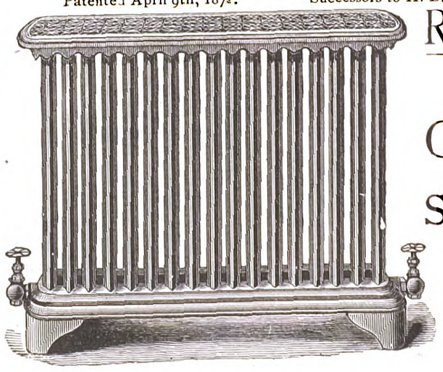

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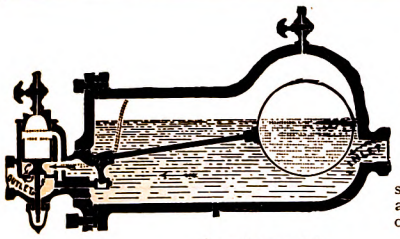

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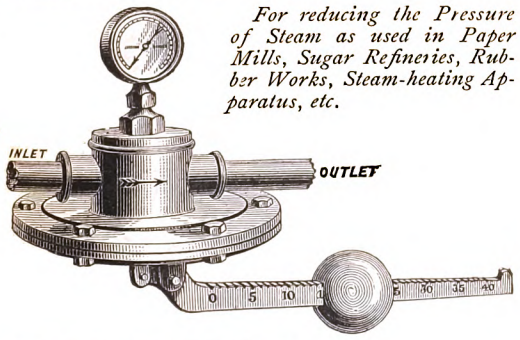

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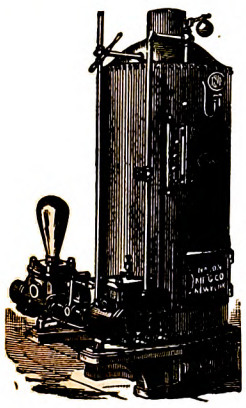

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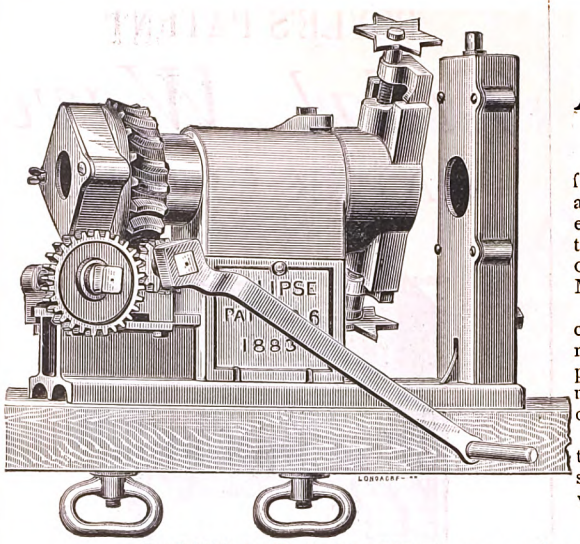

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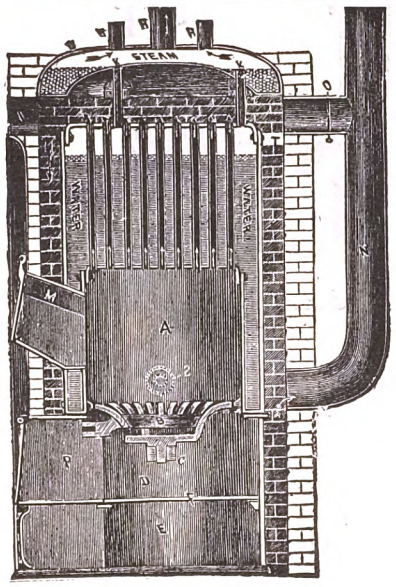

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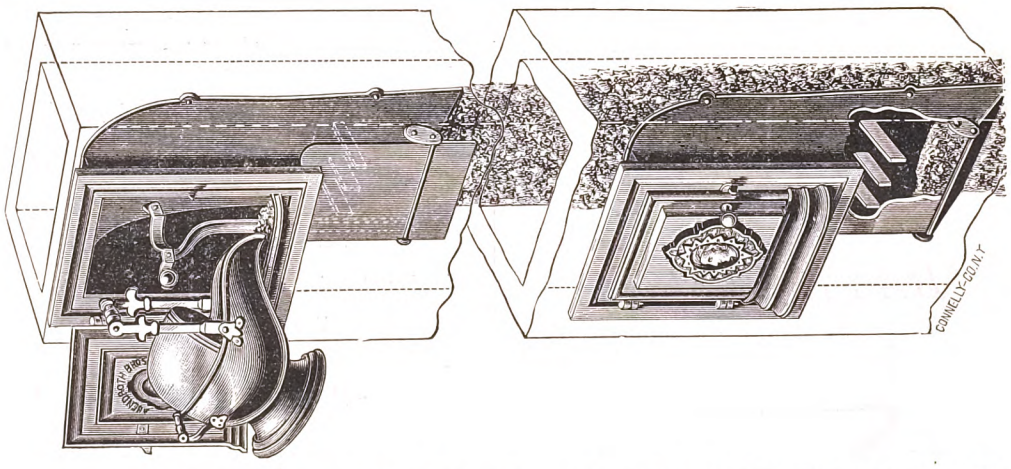

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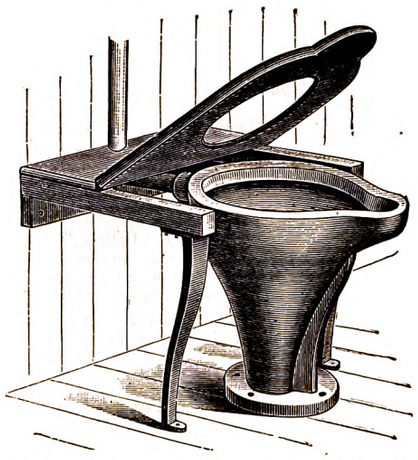

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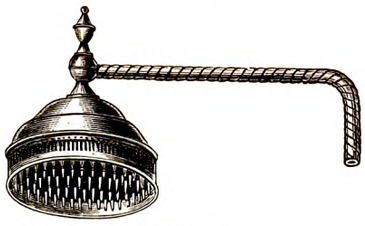

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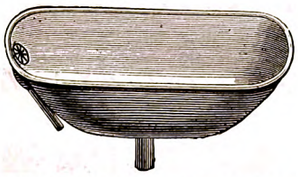

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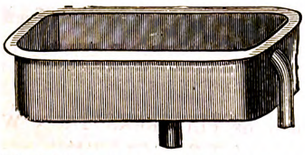

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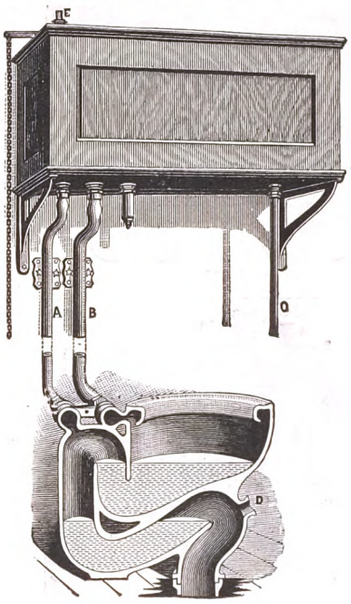

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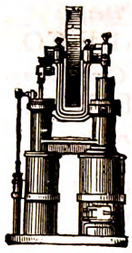

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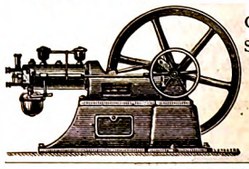

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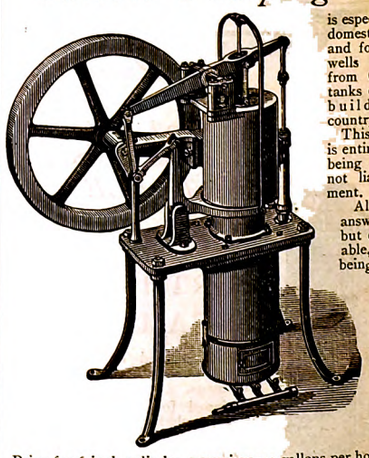
Caloric Pumping Engine



is especially intended for domestic use in lifting and forcing water from wells and cisterns, or from Croton pipes, to tanks on upper floors of buildings in city or country.

This pumping engine is entirely safe, no steam being employed, and is not liable to derangement.

All kinds of fuel will answer for this engine, but coal-gas is preferable, the consumption being only 15 cubic feet per hour. Besides, gas is handier and cleaner than coal or other combustibles. Servant girl can operate it.

Price for 6-inch cylinder, pumping 200 gallons per hour 50 feet: With gas furnace, $210. With coal furnace, $220

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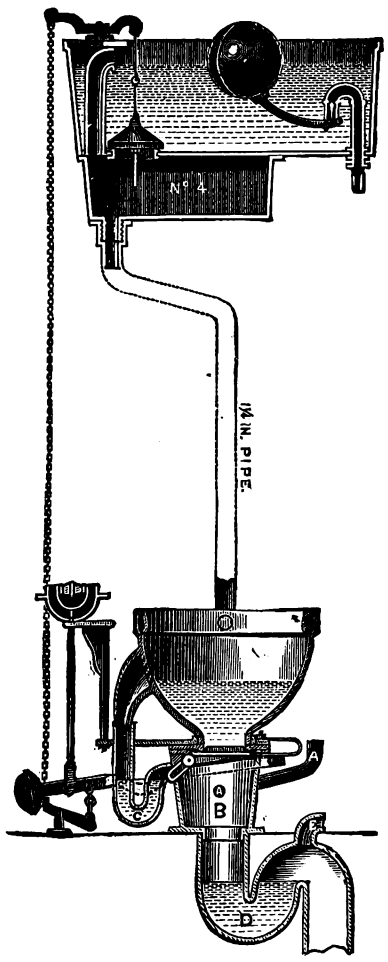
With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



The names of some of the parties using them and those having them for sale with full descriptive circulars, will be mailed on application to us.

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CAST LEAD LINED WATER CLOSET CISTERNS.

The following advantages are claimed:

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2. *They are cast stronger at the Corners, tapered each way, and it is believed will last longer than any Cistern made from Sheet Lead, burnt or soldered together.*

3. *The Working Parts have Brass Bearings. Should the Cistern get damaged, it can be easily repaired, whereas the Iron ones would have to be replaced.*

4. *Should the Cistern be pulled out, or repaired, the metal has some value, whereas broken Iron Cisterns are comparatively worthless.*

5. *These Cisterns will not rust and the water from them will not discolor the bowls of the Water Closets.*

6. *The rush of water from a Wooden Cistern, lined with lead, occasions less noise than from a Cast Iron one.*

We are now making five different styles and will be able to furnish them adapted for any style of Water Closet. Plumbers having unexecuted contracts requiring cisterns are invited to call and examine those we have thus far made.

We designate them as follows:

No. 1 *"Em Ess" Lead Cistern.*
(This is intended for flushing Hopper Closets, has an independent overflow as required by the New York City regulations.)

No. 2 *"Em Ess" Lead Cistern.*
(This is the same as the No. 1, except that it has the overflow arranged to go to the Hopper, as is the usual practice in this country.)

No. 3 *"Em Ess" Lead Cistern.*
(Is the same as No. 2, with the addition of a service box of a size adapted for use over a pan closet.)

No. 4 *"Em Ess" Lead Cistern.*
(Is arranged to discharge a given amount of water by means of a syphon. The action of the syphon being started by the pulling up of a valve, a flush is sure to be obtained, since if for any reason the syphon should fail to act, a flush can be secured by holding the pull a few seconds as with the ordinary cisterns. This cistern may be used with the Hopper and wash-out style of water closets, and can be arranged to make a flushing apparatus for urinals.)

No. 5 *"Em Ess" Lead Cistern.*
(Is a double compartment waste-preventing cistern; constructed so that not more than three gallons can be drawn at one pull of the handle. It is also provided with the independent overflow, and arranged to secure the minimum tax of the New York Water Department.)

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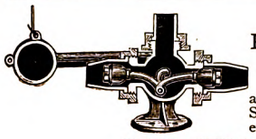

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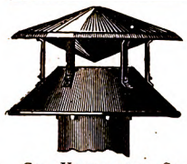

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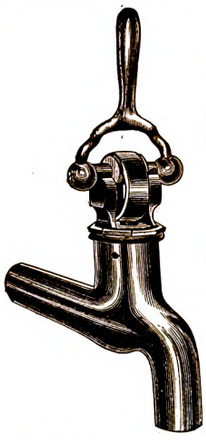

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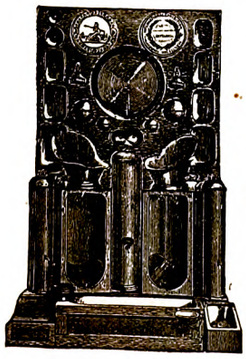

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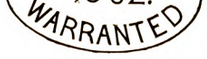

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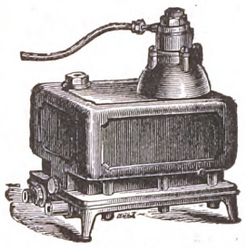

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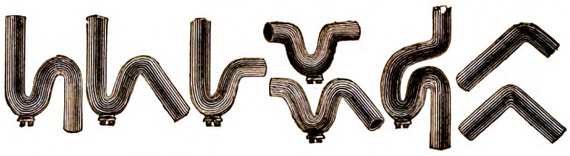

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WITH IMPROVED FLUSH. (Registered).

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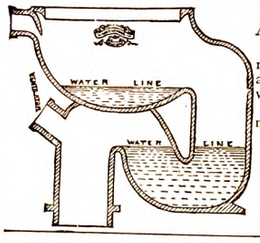

An important alteration has been made in the *flushing* arrangement of this closet. The *supply* is now placed *opposite* the *outlet*, and a *new registered fan* attached which makes the closet more effective, and with less than two gallons of water it is guaranteed to perfectly flush out the soil and thoroughly wash the inside of basin.

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For the perfect working of this closet a supply pipe not less than 1¼ inch must be used.

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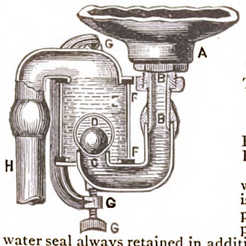

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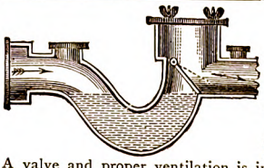

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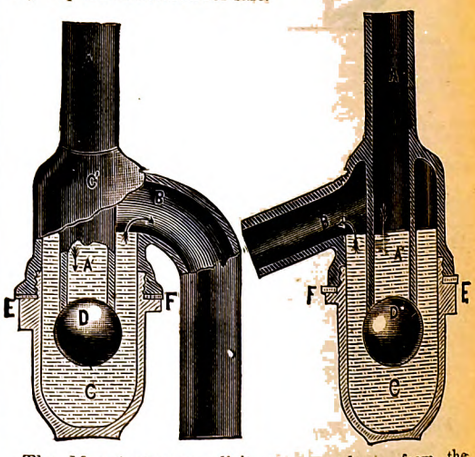

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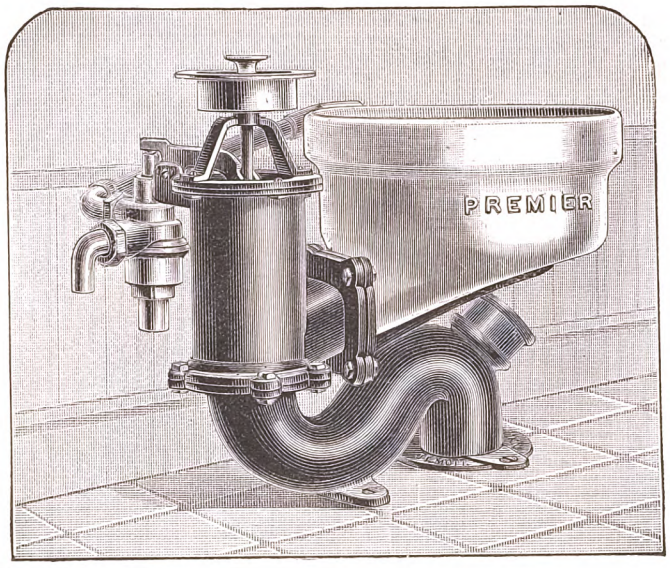

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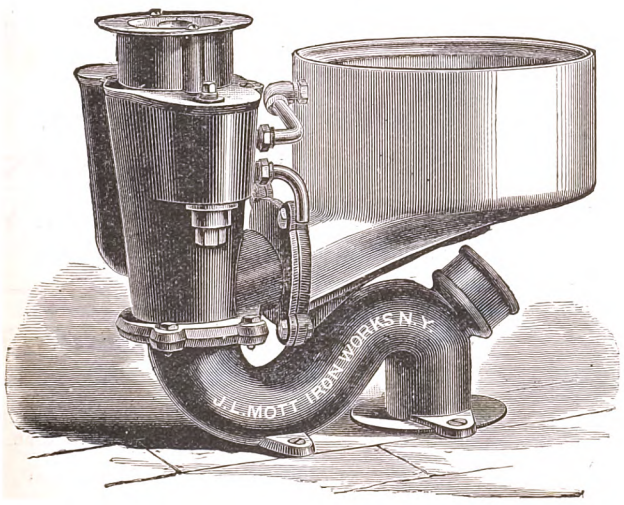

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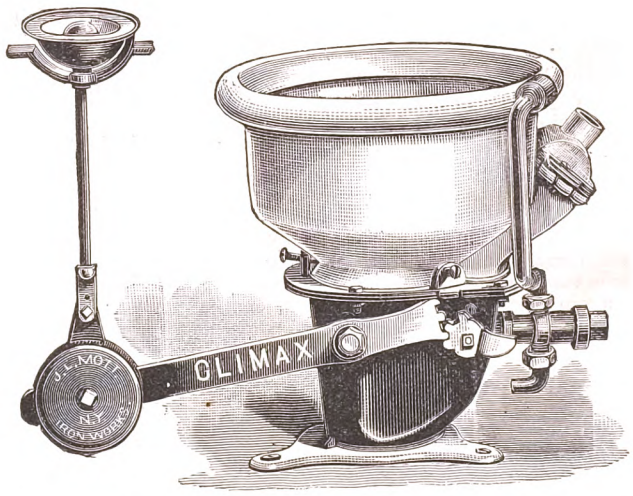

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THE ABOLITION OF MALARIA.

During the last few years an interesting experiment has been in progress in the vicinity of a Trappist convent on the Campagna, near Rome, at a station known as the Three Fountains, which for a number of years has been pre-eminently unhealthy. So much so indeed that it was practically impossible for anyone to live there during the summer and autumn, and a visit to it, except in midwinter, ranked as a dangerous expedition.

At last the monks undertook to drive away the malaria by means of drainage, the culture of the vine, and especially by extensive planting of the eucalyptus. The effect produced was good, the level of the sub-soil water was lowered several feet, the monks were able to remain throughout the year, and the Government taking a strong interest in the experiment sent in 1880 a large gang of convicts to extend the work.

All went well in 1881; there was very little sickness among the convicts or their guards, the plantations were largely extended and many believed that the problem of the abolition of malaria had at last been solved. But in 1882, while the malarial fevers were much less prevalent and less severe throughout the Campagna, which diminution was supposed to be due to an unusually dry summer and cool autumn, there was one exception to this, and that was, most unfortunately, the Three Fountain station.

Every person who remained at this place during the summer and autumn of 1882 suffered from malarial fever.

Among the monks the fever assumed a mild form, among the guards it was unusually severe, and most of them had to be promptly relieved and sent elsewhere. Of the prisoners some had mild attacks, others very severe.

Upon this condition of things, Professor Tommasi Crudeli, the well-known author of the *bacillus malariæ* theory, remarks that "the object of sanitary work as regards malaria is to modify the physical conditions or the chemical composition of the soil in such a manner that it shall be no longer capable of producing it. If all malarial soils were alike, we might be certain, or nearly certain, that we could make them healthy by a system of culture and drainage which has evidently succeeded in some instances.

"Unfortunately, malaria may be produced in the most diverse soils, and that which perfectly succeeds in abolishing it in one place may have little or no effect in another.

"Plantations of eucalyptus appear to have had a good effect in some cases, yet Professor Liviesedge, of the University of Sydney, states that he has seen malaria very prevalent in a eucalyptus forest. As yet we are working blindly; sometimes we obtain good results, sometimes it seems as if we made matters worse. We need careful study of the natural history of malaria, of the effects upon it of change of character or condition of soils, etc., etc."

These views of Professor Tommasi Crudeli are no doubt influenced by his idea of the persistence of the germ of the *bacillus malariæ;* and extensive experience in this country of the good results of drainage and culture would seem to leave little room for doubt as to the sanitary value of these measures, yet his propositions are so far true that no one familiar with the subject would be willing to guarantee to free a locality from malaria by such means, although he might strongly recommend them, and there can be no doubt that careful study of the subject is extremely desirable.

Just how and where this study is to be made does not appear as yet, but the interests involved are so great, and the education of the public in these subjects is progressing so rapidly, that it cannot be long before we shall see a systematic investigation of malaria by competent scientific men undertaken and carried out as it should be.

THE NATIONAL BOARD OF HEALTH.

We have seen with great regret during the last two months, a series of news items from Washington in the daily press, which indicated that the National Board of Health was struggling to obtain control of the special epidemic fund, of one hundred thousand dollars, placed by Congress at the disposal of the President for prevention of the spread of epidemic diseases. With regard to the attempts of friends of the Board to induce the President to commit the charge of this fund to the Board, we have only to say that we have not considered such attempts expedient, first, because the action urged upon the President was directly opposed to what everyone knows was the intent and purpose of the House of Represenatives in granting this appropriation, and second, because we were convinced that the attempts would not succeed.

Had the President been induced to turn this fund over to the Board, and had the Board used any part of it to pay their office or clerical expenses, for which no other appropriation has been made, we believe such action would have been wrong, contrary to the intent of Congress in making the appropriation, and extremely detrimental to the interests of a National Health Organization.

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The President has, however, placed the expenditure of this fund under the direction of the Secretary of the Treasury, who has written a letter to the Surgeon-General of the Marine Hospital Service, of which the following is a copy:

"The President has directed the Secretary of the Treasury to take charge of the expenditure of the appropriation in the sundry civil appropriation act of March 3, 1883, for the prevention of the spread of epidemic diseases. This Department has determined to commit to the Surgeon-General of the Marine Hospital Service the inquiry into the need of the use of the money, and the duty of applying it in cases that arise thereupon; and you are hereby authorized to make requisition from time to time for such sums as may be deemed necessary to carry into effect the purposes of said appropriation, to be expended in accordance with the existing regulations of the marine hospital service."

It seems to us that the only dignified and proper course for the members of the National Board to pursue is to at once resign their positions. This course is desirable not only for their own sakes, but in the interest of a national public health organization.

Personally we have the highest regard and respect for those members of the Board whom we happen to know, but they are not the only men in this country who are fit to be in such a position, and the President should be allowed the opportunity to try some new men, and see whether it is not possible to organize a Board which will command the confidence of Congress.

It is very clear to us that such a Board should not be composed wholly of physicians, no matter how learned they may be; the great business interests of the country should be represented on it.

During the next Congress we must have some legislation with regard to our National Health Organization, and with the experience gained, we believe it will be possible to put such an organization on a permanent and satisfactory basis.

The present plan has proved a failure, for reasons which we pointed out last fall, but the friends of the National Board and of National Sanitary Work have no reason to be discouraged.

Let the present members of the Board resign, in order that no one can discredit their advice by charging them with a desire to hold office, or carrying out a sort of a dog-in-the-manger policy, by refusing to let any others have an opportunity of seeing whether they cannot secure better results; and having resigned, let them then give the country the benefit of their experience, and advice as to what legislation is necessary to properly organize the Board, and to enable it to do good work.

We are glad to see that the Boston *Herald* is calling attention to the mischievous bill that recently passed the lower house of the Massachusetts Legislature, which should be entitled "A Bill to Protect the Adulterators of Food." In our issue of May 10, we called attention to some of its bad features. The friends of an honest anti-food adulteration law should see that this measure is defeated. In our opinion it was dishonestly conceived, is dishonestly pushed, and would encourage dishonesty if a law. If the Legislature will grant the necessary appropriations for its enforcement, the present law is ample to afford protection to both the consumer and the honest dealer.

One of the humors of the "Tariff Debate" was the zeal with which certain members went for free trade, coupled with judicious protection for the products of their own sections. An equally amusing illustration of the same principle was given when the wells of Brooklyn were discussed by the Aldermen last week. It was evident that certain members, since our last report, had posted themselves up. They expressed strong sentiments on the danger of well pollution, but when it came to the particular wells in their particular wards a universal exception was made, and the Board at large must have been delighted to find that every well had its own defender, who might be presumed to know most about it. The whole question was finally disposed of by *leaving it to the alderman of each ward to decide on the quality of the wells in that ward.* Brooklyn is to be congratulated on the quality of pure well water, which will be discovered within her limits, and might reward the aldermen by gifts of it as something strange and new to them.

An elegant cottage has been built during the past winter at a favorite seaside resort, the water for which is to be taken from a well 30 feet deep, close to the house. Not 30 feet from the well, and close to the house, a cesspool was excavated 10 feet deep, the bottom left unpaved, and the walls laid up with brick, dry, and then arched over, with no ventilator. The contractor, a plumber, who knew better, on being remonstrated with by an outsider who saw the work, said that he had followed the architect's express instructions. Thinking over it, however, he took the liberty, on his own responsibility, of plastering the walls and bottom, leading a ventilating pipe to the roof and providing an overflow into a pipe leading to tide water. If the owner of that house had had his own and the architect's way, and had suffered from it, he would, doubtless, have deemed his affliction an "inscrutable dispensation of Providence."

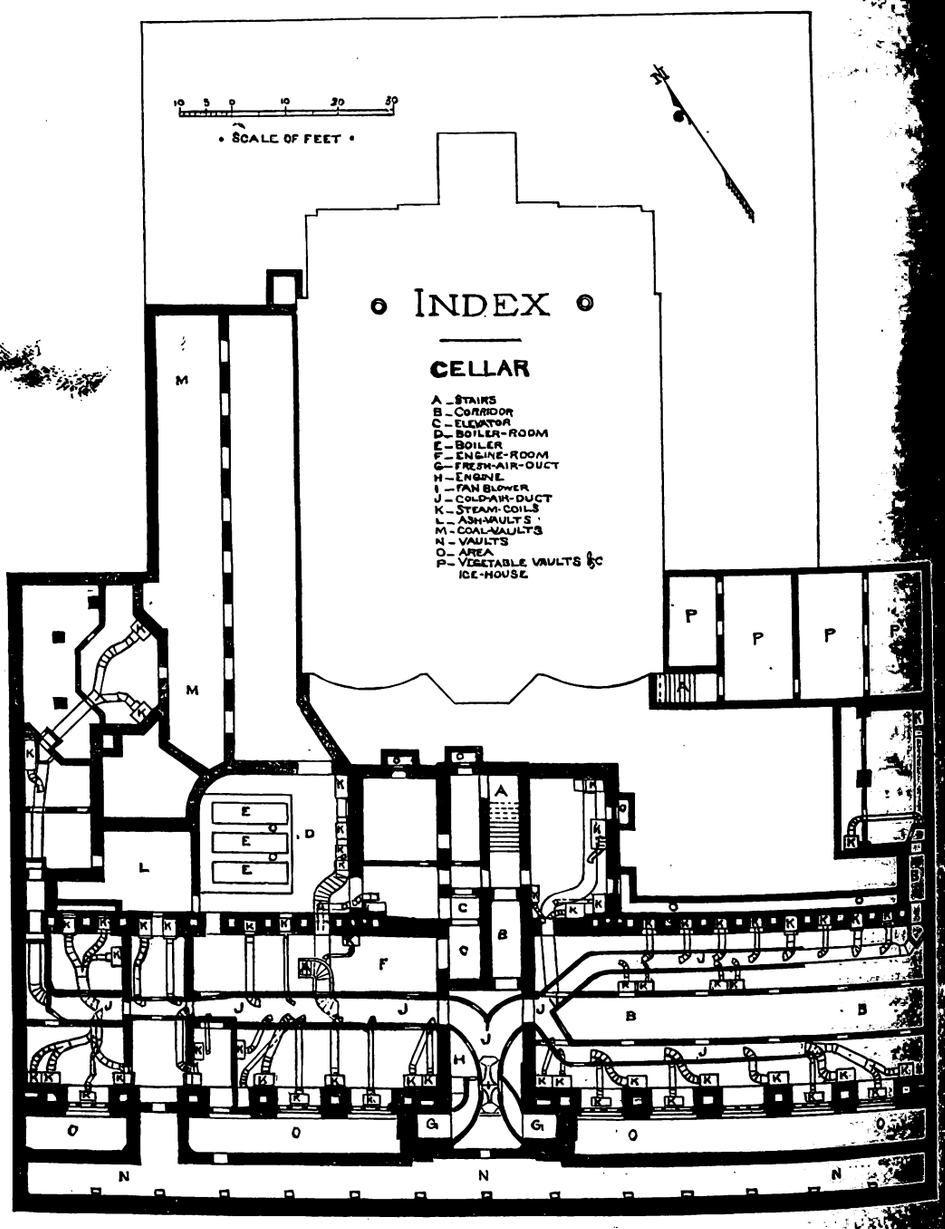
LETTERS TO A YOUNG ARCHITECT ON VENTILATION AND HEATING.

BY JOHN S. BILLINGS, SURGEON, U. S. A.

No. XLVI.

While the ventilation and heating of the Barnes' Hospital, as described in my last two letters, have proved very satisfactory, as is shown not only by continued and carefully applied tests, but also by the fact that while for the last four years this hospital has been constantly overcrowded in the sense that it has contained from 25 to 40 per cent. more patients than it was intended for, no evil results have thus far been produced, and the air in the hospital is, as shown by very recent examination, quite free from unpleasant odor; there are, nevertheless, some points in regard to which the arrangements for ventilation might be improved.

In the first place, there are no means by which the temperature of the fresh air issuing from any given register can be rapidly changed without interfering with the amount of air introduced. I say "rapidly changed," because the change can be effected by varying the amount of hot water allowed to circulate through the coil, by means of the valves placed in the supply pipe for each coil; but it requires nearly an hour for the coil to cool down to the extent that it is



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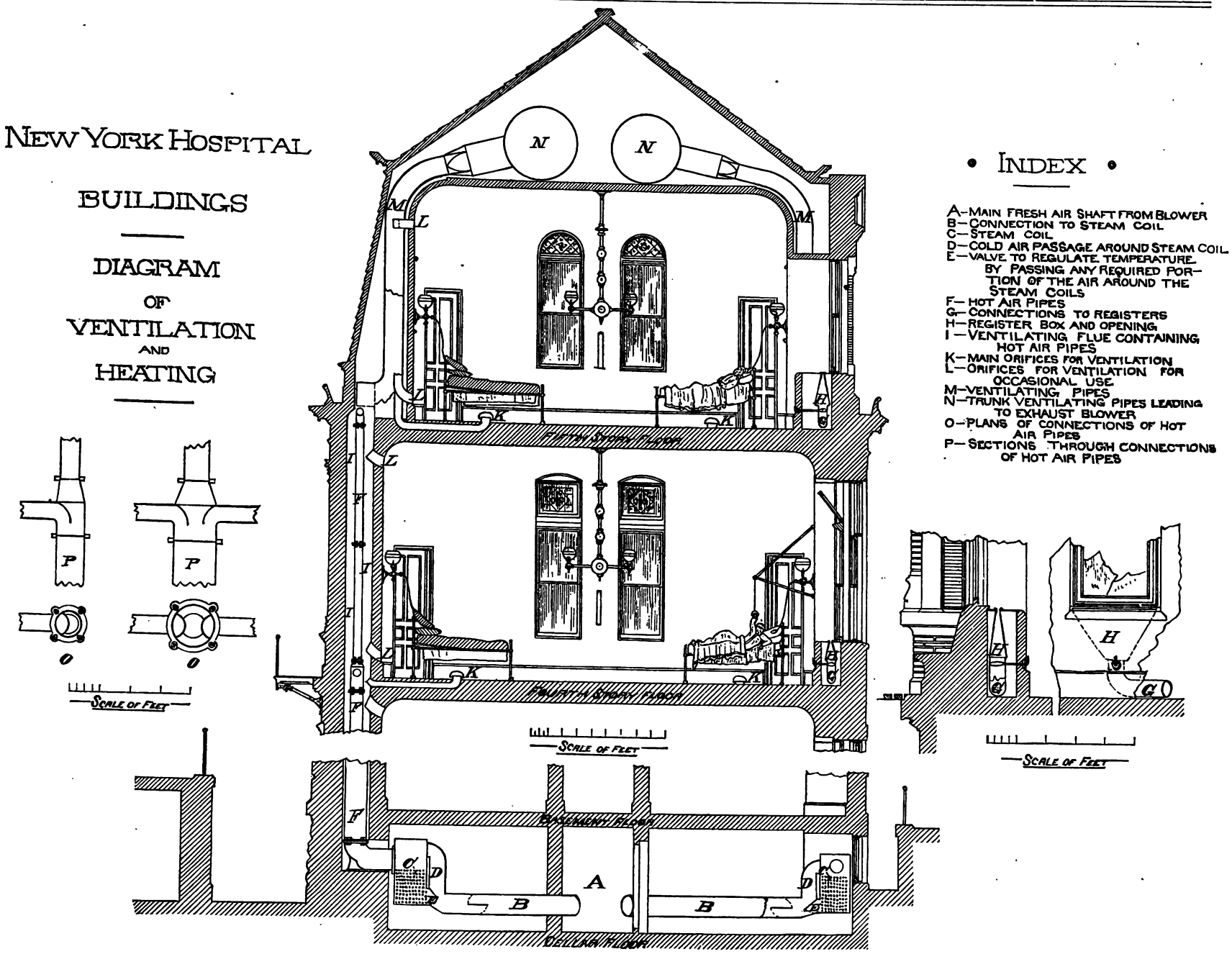
NEW YORK HOSPITAL BUILDINGS



sometimes desirable should occur in five minutes. The means by which this rapid change can be effected will be described presently.

In the second place, the proportions of the air ducts, fan and chimneys are not quite such as to secure the best results obtainable with a given expenditure of force. The amount of air delivered at some registers is greater than that which comes from others, and the same is true as regards the foul air exhausts, so that in order to secure sufficient supply and exhaust at all points we must have more than is necessary at some points. It is very true that this excess is useful, and that as regards hospital ventilation, "nothing less than too much is enough."

A third objection is the position of the foul air registers in the floor along the centre of the ward. The tendency of patients to spit down these registers or to throw things into them is very great, and while no evil results have followed in a hospital which is under military discipline, and where the foul air boxes are cleaned every day, it is better to transfer these registers to a point beneath the beds, where they are out of the way and equally efficacious.

The placing of the kitchen in the third story of the hospital was a decided success in more ways than one. The odors from cooking are almost entirely excluded from the building, although sometimes the lift which passes from the kitchen down to the dining room acts as a sort of air pump, and draws or forces some of the air from the kitchen down to the second floor.

This principle of placing the kitchen on the upper floor was adopted in the new New York Hospital, the plans for which, prepared by the architect, Mr. Geo. B. Post, were adopted in 1875.

This hospital is located near the centre of New York City and is an illustration of an attempt to make up in height for deficiency in ground area.

The general arrangement is shown in the accompanying plans, which are copied from those prepared by the architect to illustrate his description of the building, which is of brick and contains 163 beds. In the wards there is one window to each bed, each external pier of the building being a flue which is lined with hollow bricks to prevent, as far as possible, loss of heat by radiation. Through the centre of these flues run cast iron pipes intended to be fitted so as to be air-tight, and through which fresh air is taken to the building, being forced in by a fan.

The spaces outside these fresh air pipes are the foul air flues. These terminate above in pipes leading to an exhaust fan, which is located in the top of the centre building.

The heating is by steam, the coils being arranged at the bottom of the fresh air pipes in such a way that by a valve the cool air from the propelling fan can be sent either through or around the heating coil. The fresh air is admitted to the wards through slits in the window sills, forming a jet directed upward on the principle of Tobin's tubes. A similar arrangement exists in the pavilion of the London Hospital, erected in 1875–6.

The openings for the exit of foul air from the wards, are in part placed in the walls of the piers, and in part beneath the beds.

No effort or cost was spared in the construction of this building, to overcome the difficulties connected with the arrangement of heating and ventilation of a building of so many stories, all of which through the staircase halls and elevator shafts, are practically in free communication with each other, and a fair amount of success has been attained. I do not know of any published observations showing what the actual operation of the apparatus is, but I have visited the hospital several times and have twice tested the currents with the anemometer. These testings made the average air supply to be about 2,400 cubic feet per bed per hour—an insufficient amount, if all the beds were full, which, however, was not the case.

The principle of placing fresh air pipes inside of the foul air ducts is one that cannot be approved of for hospital ventilation, for although the fresh air pipes are of iron—and may have been tightly fitted—it is a mere question of time when some communication will be established between the inner and outer surfaces of these pipes, either by rusting or by alternate expansions and contractions, and then the foul air may be carried back into the wards. The iron pipes are not readily accessible, inclosed as they are in the brick walls, and there is no ready means of determining their condition. On one occasion, when I visited the hospital, the fumes of burning sulphur, which was being used to disinfect a room at some little distance, entered the room in which I was. Precisely how this was effected could not then be ascertained, but it indicated that the system was not working satisfactorily.

The principle of having two fans, one for propulsion and the other for exhaust, is not peculiar to this hospital; it was tried for several years

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in the hall of the House of Representative at Washington, but the results were not satisfactory, and the plan is not one to be recommended. A single powerful exhaust is the system best calculated to overcome the peculiar difficulties met with in attempting to secure a satisfactory distribution of air in a lofty hospital of many stories.

But while the resources of modern engineering are no doubt competent to secure satisfactory ventilation in a hospital ten stories high, if necessary, they can only do this at a comparatively great cost, and it is therefore now generally admitted that it is best to put hospitals where they can have plenty of room and fresh air without being compelled to go upward for them.

THE PROMOTION OF ORIGINAL RESEARCH IN SANITARY SCIENCE.

We note with great satisfaction the scheme proposed by the Grocers' Company of the city of London for encouraging original research in sanitary science. This scheme, as reported in the *British Medical Journal*, is as follows:

"It consists of two forms of endowment: the one, meant as maintenance for work in progress, in fields of research to be chosen by the worker himself; the other, meant as a reward for actual discovery, in fields of research to be specified from time to time by the Company. With the former intention, the Company establishes three Research Scholarships, each of £250 a year; with the latter intention, they appoint a Discovery Prize of £1,000, to be given once in every four years.

"*Research Scholarships.*—The Research Scholarships are intended as stipends for persons engaged in making exact researches into the causes of important diseases, and into the means by which the respective causes may be prevented or obviated. The Court of the Company propose to appoint to two of the scholarships in May, 1883, and to a third in May, 1884, after which the vacancies which occur will be filled in each succeeding May. Subject to the conditions of tenure, each appointment will be for one year, and the holder will be eligible for reappointment.

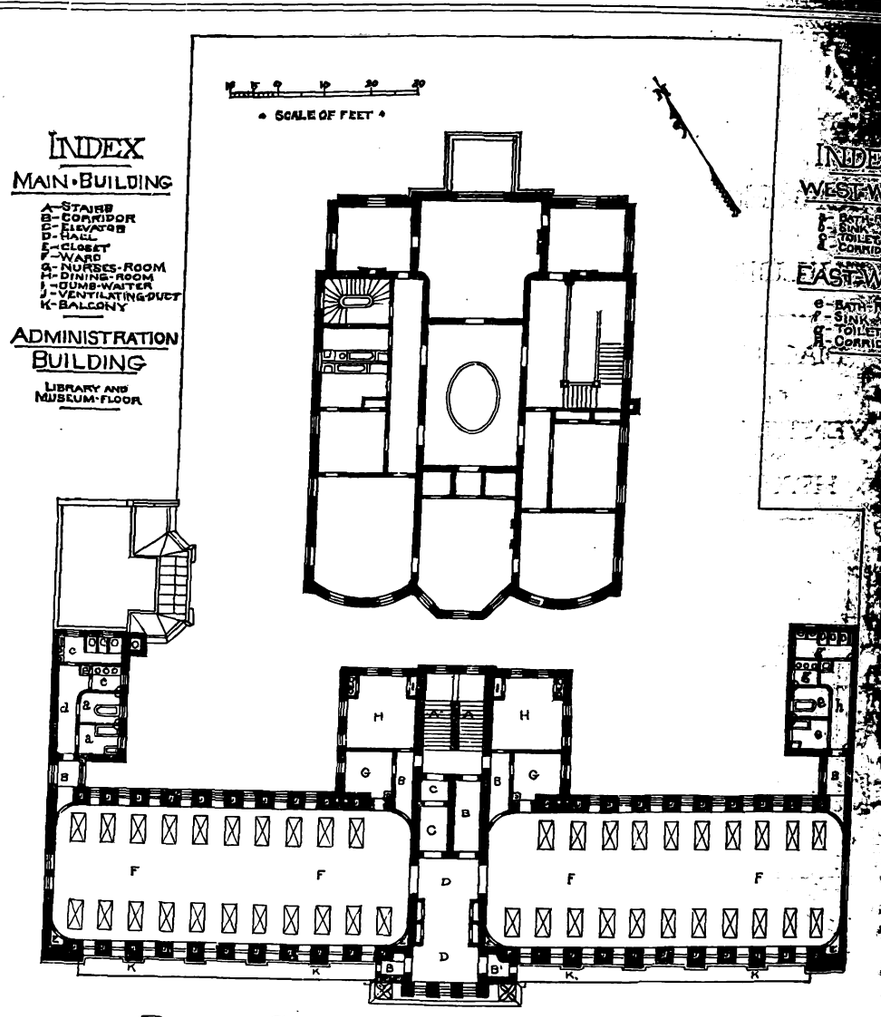
"*Candidature for Scholarships.*—Applications for appointments to scholarships must be made during the month of April in each year, by letter addressed to the Clerk of the Grocers' Company, Grocers' Hall, London, E. C. Candidates must be British subjects, and, when competing for a first appointment, must be under the age of thirty-five. Each candidate, in his application, must make an exact statement of the research or researches which he proposes to undertake, and must declare that, if appointed, he will conform to the conditions under which the scholarships are held. His application must be accompanied by first class testimonials; both general, as to his personal and scientific character, and special, as to his qualifications for the research or researches which he proposes to undertake; and he may, if he pleases, also adduce, in support of his application, the evidence of any work which he has in progress, or has already published, in the same, or in any kindred field of study. Candidates may be required to wait upon the Court, or upon the Scientific Committee appointed by the Court, at some time in the month of May. * * * The general intention will be, that, as between candidates whose evidence, of character and qualification are considered adequate, preference shall be given to the candidate whose application proposes the more important research; and that researches shall be considered important in proportion as they are judged likely to throw new light on the causation or preventability of some important disease or diseases.

"*Quadrennial Discovery Prize.*—The quadrennial discovery prize is intended to reward original investigations which shall have resulted in important additions to exact knowledge in particular (previously defined) sections of sanitary subject-matter. The Court will, once in four years, propose some subject for investigation, and a period of at least three and a half years will on each occasion be allowed for the investigation of the subject that has been proposed. In determining, on each occasion, what particular subject shall be proposed for the prize, careful regard will be had to all the scientific circumstances of the time, both as to the urgency of existing needs for particular kinds of knowledge, and as to the expectations which may reasonably be held that discovery in the needed kinds of knowledge can be made within the allowed period.

"The subject for the first discovery prize will be announced in May, 1883, and the period for investigation will extend to the last day of December, 1886. The Court will announce the award in May, 1887, when also (as at present advised) they will propose a further subject for investigation. The general conditions of candidature and award will be as below stated, but with liability to amendment from time to time; and on each occasion when a subject for the discovery prize is announced, special conditions referring to the particular subject may also have to be laid down. All the conditions which at any particular time shall be in force will be obtainable from the Clerk of the Company.

"*Candidature for Discovery Prize.*—The discovery prize will be open to universal competition—British and foreign. The period allowed for the competition will begin with the day of announcement of the subject for investigation, and will end with the last day of the fourth following December. Any person who desires to be regarded as a candidate for the prize must deliver or cause to be delivered at the hall of the Company, within the allowed period, a letter in which he declares himself to be a candidate for the prize, and the treatise on which he bases his candidature; such letter, and such treatise, to be addressed to the Clerk of the Company, who will give a dated receipt for the same. The competition treatise of a candidate may, if the candidate so prefer, be delivered in successive parts, each bearing its proper date. Each treatise in competition for the discovery prize must be an original work by the candidate who sends it in. It may be a treatise which he has published at any time within the allowed period, or may be a treatise which he has not previously published. Although candidature is not restricted to any one nationality, all treatises and all communications with the Company in relation to them must be in the English language. Translations into English of competition treatises published (within the allowed period) in a foreign language will be received on a like footing with treatises originally in English. All treatises must be in print. Each treatise must bear the name of its author. Any particular candidate may be required to demonstrate practically to the Court or the Scientific Committee any fact or result which he claims to have discovered. Candidature will be held to imply that the candidate undertakes to accept as regards himself the award which the Court shall make."

This is going to work in the right way, and we sincerely hope that the example thus set will be followed in this country.



PLAN OF SECOND, THIRD, AND FOURTH STORIES

NEW YORK HOSPITAL BUILDINGS

HEALTH MATTERS IN TENNESSEE.

Dr. C. C. Fite, the Secretary and Executive Officer of the State Board of Health of Tennessee, has presented to that body an interesting report for the quarter ending March 31, from which we take the following notes:

The greater part of the work of the Board during this period has been connected with small-pox, which has appeared at various places in the State. Dr. P. D. Sims, of Chattanooga, reports the total number of cases in that city from Jan. 7, 1882, to April 1, 1883, to be 685; number of deaths 335; a very heavy mortality.

Dr. Richard Cheatham, of Nashville, reports the number of cases in that city from Jan. 1, 1883, to March 31, 1883, to be 151; 103 of which were in the colored population:

"Knoxville had a good deal of trouble for a while—in December and January—but early in January the City Board of Health induced the City Council to appoint nine vaccinators, who did their work well, and the disease was soon under control. Up to Feb. 5 they had thirty-one cases, not including the cases developed previous to January 1.

"Dr. A. McNabb, President of the Cleveland Board of Health, reported, Jan. 26, that there were ten cases; by Feb. 13 three more cases had developed. No report from that point since the above date.

"Dr. S. P. Hood had charge of the cases at Mossy Creek, and displayed an unusual amount of executive capacity in the way he managed it. Up to Feb. 27 he reported forty-eight cases. Of eighty exposed persons, only four had ever been vaccinated. By prompt isolation and vaccination, the disease was controlled successfully.

"Early in February a case was developed near Gainesboro, Jackson County. The county authorities had a great deal of trouble in preventing the neighbors from visiting the case, but by prompt and vigorous measures the disease was limited to six cases, and the entire county is now well vaccinated.

"The cases at Johnsonville created a great deal of alarm up and down the Tennessee River, and on the line of the railroads the demand for quarantine was general and vigorous, but the safer plan of vaccination was finally adopted, and a large scope of country that has had no vaccination since the war is now well protected. At Nixon, a boat-hand who had helped carry a case at Johnsonville, was the cause of no little alarm, but as the local board was ready to take charge of it, there was no new cases. Jan. 4 a case was developed at La Guardo, Wilson County. Dr. W. W. Prater reported five other cases developed from that one in the same household.

"Nearly every other town in the State has asked for permission to quarantine against the infected points, but the advice has always been—Small-pox is a continuous epidemic, and an absolute quarantine almost impracticable, differing from the limited summer epidemics.

"The danger on the rivers is from steamers; they ship hands without ascertaining whether or not they are vaccinated, and if they take sick they are put off without regard to consequences.

"If vaccination was a new and untried preventative against the small-pox, the experience of this office, in the past three months, would establish its value beyond controversy. If we were to enumerate the points at which it was exemplified, it would take page after page to give the plain facts. Vaccination, genuine, complete and exhaustive, will put out an epidemic of small-pox as certainly as a bucket of water will a lighted torch. Wherever vaccination has been neglected, or carelessly or superficially done, the battle against the loathsome disease has been long and tedious. Quarantine is, of course, a necessity, as vaccination is so much neglected and avoided. But this office has certainly taught the doctrine to quarantine the diseased, but vaccinate, vaccinate, until everybody is protected."

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WATER CLOSETS AND RADIATORS.

AN ILLUSTRATED CHRONOLOGICAL ACCOUNT OF ALL PATENTS WHICH HAVE EXPIRED AND ARE NOW PUBLIC PROPERTY.

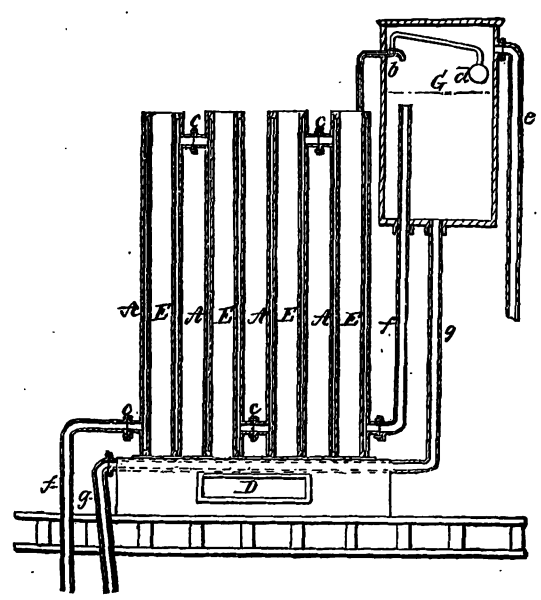
BY F. B. BROCK, ESQ., WASHINGTON, D. C.

No. II.—RADIATORS.

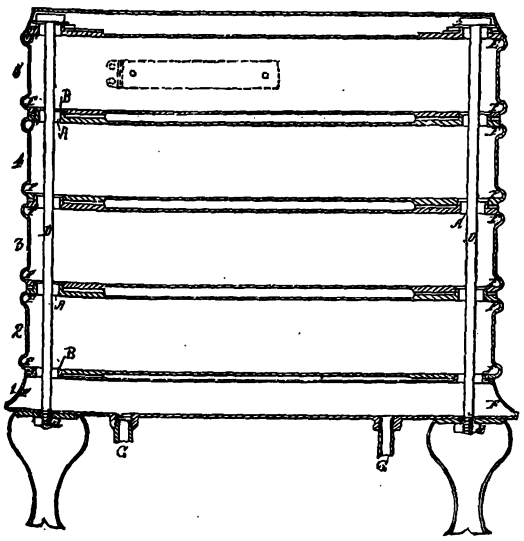
January 25, 1848, Anthony E. Hitchings devised the heat-radiating apparatus shown by the accompanying cut, which is a vertical sectional view. The nature of the invention consists in providing a series of double concentric cylinders, connected alternately at top and bottom, and in communication with a boiler for supplying and circulating hot water to and through the apparatus and back again to the boiler. A ball cock is provided to guard against overheating, and to keep the water at its proper level.

A is the outside and *E* the inner concentric cylinders. The hot water from the boiler (not shown) passes up the pipe *f* into the first cylinder *A*, and between it and the cylinder *E*, round which it circulates. When it reaches the top of the cylinder it passes through pipe *c* to the second cylinder, down this and through the connecting pipe to the third, and then to the fourth, or through as many as may be used. From the last it is forced into the reservoir *G*, which is filled a few inches above the pipe *f*. The water here escapes down the return pipe *g*, through the air-box pedestal having opening *D*, back again to the boiler. *e* is an overflow pipe, *d* is a ball-cock allowing of the automatic communication through pipe *b* with the radiators and reservoir, should the water get low, thereby relieving any pressure which may be generated in the radiators under such circumstances.

In the construction patented by Adrian Janes, January 29, 1850, a number of horizontal pipes are arranged one above the other, connected by a header at each end, and form what the inventor terms a "gang." Several of these gangs are placed side by side, having suitable connections, and are called a "cluster." The whole is inclosed in a non-conducting chamber, into which external air is admitted, and from which it is drawn after being heated.



HITCHING'S RADIATOR.



WILSON'S RADIATOR.

C represents the series of headers, having sockets for the reception of the horizontal pipes. Any number of gangs thus formed, each independent in itself, is placed side by side to form a cluster or radiator of the desired magnitude.

The gangs are all connected at one of the vertical headers near the top by a "union box" *D*. At the opposite end of the radiator, at the bottom, is another box *D*. *A* represents the inlet pipe from a boiler *G*, and a return pipe *B* connects with the other union box *D* and leads back to the boiler, forming a complete circulation.

The elongated union boxes *D* have as many connecting pipes in communication with the headers as there are gangs in the cluster or radiator.

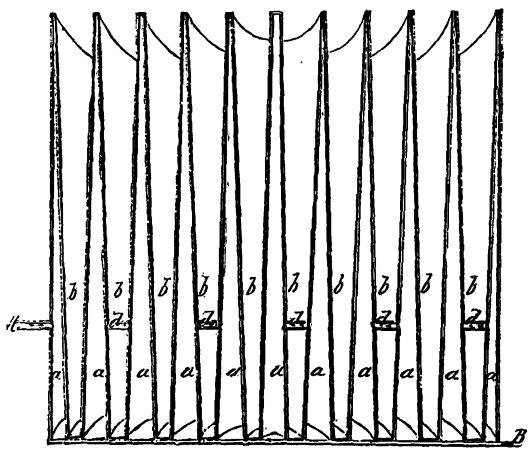
Nov. 4, 1851, Joshua K. Ingalls devised a steam radiator, for which he obtained letters patent.

The cut illustrates, in sectional view, his construction, the nature of which consists in giving a tapering form to the radiating surfaces. Ingalls states that by applying this principle to extremely narrow chambers and air spaces alternately repeated, he brings the air in contact with the whole extent of heating surface, and imparts a current to the heated air which, it is stated, it would not have without the tapering form. The radiator is made of sheet or cast metal, in the form of a system of concentric cylindrical chambers *a*, each being about an inch thick at the bottom, with a slight but gradual taper toward the top. The alternate spaces *b* are for the air, and are made to increase toward the top by the receding of the chambers. The several chambers are united by means of pipes *d*, so as to allow free circulation through them. The series of chambers *a* and air chambers *b* may be arranged in square form, if desired. The air is supplied at the bottom; as it enters the spaces *b* where they are narrowed, it is forced upward by the action of the heat. The expansion of the heated air causes the spaces *b* still to be filled, so that the air absorbs the maximum of heat, the heat becoming latent in the air in consequence of its expansion, and is re-supplied from the upper surfaces. Thus, it is said, a greater amount of heat is taken up and thrown out (by the current imparted) in consequence of the expansion and the tapered surfaces.

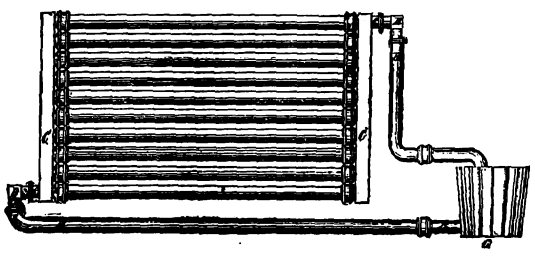
Tasker's improvement consisted of a method of putting together the radiator tubes for warming buildings either by hot water or steam.

A represents a single series of tubes of the radiator, composed of a number of tubes, *a*, joined together, and having free communication with each other by means of the tubes *G D*, and the end or terminal sections *E*. These sections are fitted to each other by the shoulder and flange joints *E F*, and made water-tight by the through bolt *H*, which passes through all the sections, the joints being provided with washers of vulcanized rubber.

The through bolt *H* being surrounded by hot water or steam, expands immediately on the first application of heat, thus preventing, it is said, the breaking of the bolts, or the forcible stripping of the screw-threads by the expansion of the tubes.



INGALL'S RADIATOR.



JANES' RADIATOR.

The novelty lies in the mode of securing the several systems of radiator tubes by the employment of four terminal sections, *E*, to each system, the whole being made water-tight by the through bolts *H*. The date of this device is March 9, 1858.

Wilson's apparatus (patented July 26, 1859) comprises a radiator consisting of long, narrow boxes or tubes of cast iron, of a corrugated form transversely. Through bolts are used, whereby the boxes can be built upon one another so as to form a connecting series of chambers of any desired height, and allow of unequal expansion under the action of the heating media.

In the accompanying cut, 1, 2, 3, etc., are tubes or boxes of cast iron, having transverse corrugations *F*, in order that they may expand with the through bolts *D*, or yield to their contraction. Each box has in its lower side two circular apertures, *A*, to receive corresponding but slightly smaller nozzles, *B*, which project from the upper side of all the sections.

The through bolts, *D*, traverse the series of boxes from top to bottom, and are secured below the bottom box by nuts *d*, and serve to hold the radiator firmly together. *G* are pipes for the entrance and escape of steam.

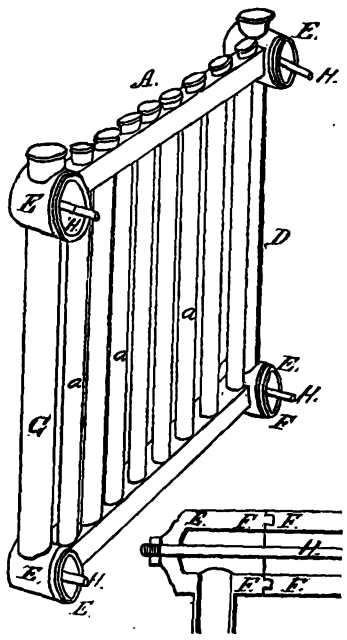
Increased capacity is had by adding to the height of the radiator without increasing the floor space, bolts *D* of suitable length therefor being required. A sheet iron cap covers the top of the apparatus.

[TO BE CONTINUED.]

NOTE.—In these articles it is proposed to alternate appliances used in connection with plumbing and steam heating. The odd numbered articles are on plumbing appliances, beginning with water closets, the even number on steam apparatus, as stated in the title. They will include all patents which are now free to be used by the public.

THE FARMER'S HOME.—The home should be favorably situated in respect to drainage; the region round about the house should be well drained, either naturally or artificially, so as to secure exemption from all diseases of malarial origin. The immediate site and surroundings of the home should be well drained, so as to secure a dry, warm, and wholesome atmosphere. A wet or damp situation is liable to produce colds, or even more serious lung affections. Good sewerage, to carry off the waste of the household, is still more important; if the sink drains and sewers of a house are imperfect, no matter how convenient or elegant the house may appear, it is not fit for anybody to live in.

Pure air, and plenty of it, is another essential of good health; little bed rooms, or even larger rooms without the means of securing a sufficient change of air, should not be tolerated. No fact in hygiene is better established than the tendency of confined air breathed over and over again, to favor the development of tubercle, or what is usually known as consumption. Hence it is, that a man's worst enemy is his own breath.—*Exchange.*



TASKER'S RADIATOR.

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Correspondence.

URINAL FOOT DRAINS—A CORRECTION.

NEW YORK, *May* 24, 1883.

To the Editor of THE SANITARY ENGINEER:

In the description, published in your issue of this date, of the plumbing work done by me in a commercial building of this city, my ideas about foot drains for urinals are not correctly given. It is true that I believe them to be of greater harm than good—not because the trap is unsealed most o the time, but because it is not flushed out often enough, the contents being allowed to become stagnant, when they give off sickening odors. The underside of the strainer, too, becomes coated with offensive matter, which adds to the foul smells.

I would also call attention to the fact that by means of the method of ventilation employed in the above-mentioned job, the room containing the fixtures is ventilated, as well as those portions of the waste pipe between the traps and fixtures, air being constantly sucked in at every fixture outlet. Very respectfully,

EDWARD DUGGAN.

BOILERS AND MAINS.

BURLINGTON, VT., *May* 16, 1883.

To the Editor of THE SANITARY ENGINEER:

I don't know but that I am asking too much of the privileges you grant some of your subscribers. I am a comparatively new subscriber, but have been an interested reader for some time, so I know I could not go to better for answers to the questions I ask.

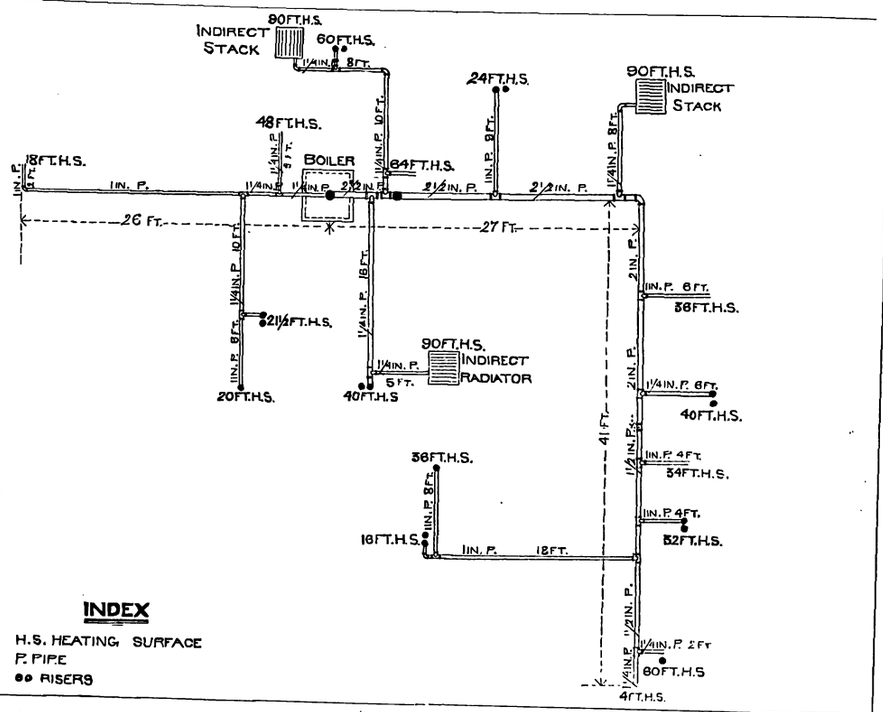
I have been called to look at a steam job in a neighboring town to discover why it does not work satisfactorily. You will see my sketch of it in which I have tried to give information enough to form an answer to my question. One party claims that the piping is too large and the boiler is large enough, and I claim that the piping is large enough but the boiler is too small. Which is right? The mains and branches are too small if estimated from Baldwin's Diagram.

By answering either in your paper or by mail you will greatly oblige A SUBSCRIBER.

[The No. 7 boiler you refer to is not too small, neither are the mains too large.

You do not tell us what the trouble is, but from the fact that you say in your memoranda "the job is perfectly noiseless at all pressures," we must assume the trouble, if any, to be that you cannot get the house sufficiently warm, in which case you must use large heaters, though according to general averages 900 square feet of surface should be enough for 42,692 cubic feet of air space.

Though the piping near the boiler is not as large as called for in Baldwin's Diagram, it may be sufficient for the difference of level between the water-line and the mains in this case, his diagram being based on ultimate conditions.]



LINING A TANK.

SPRINGFIELD, May 9, 1883.

To the Editor of THE SANITARY ENGINEER:

I write to you for information in regard to tank wiping. I understand my trade thoroughly with the exception of tank wiping, and feel as if I would like a little instruction on that point, and trust you will favor me with a reply. I have been a constant reader of THE SANITARY ENGINEER for the past year and like it very much. I have a copper tank to line—four feet high, seven feet long and four feet wide, seams up each corner and on the bottom; the tank is stationary. Yours in haste. H. C. H.

[How to line a tank with copper was explained on page 294 of the current volume. The question of lead lining was discussed on pages 559 and 583 of the fourth volume.]

A BOTCH OF A SPECIFICATION.

SALT LAKE CITY, UTAH, *May* 4, 1883.

To the Editor of THE SANITARY ENGINEER:

Inclosed you will find a copy of plumbing specifications shown me some days since, and under which plumbers here are asked to figure. In justice to the plumbers of Salt Lake City, I will say that there is some good work done here, but the majority of the work is done under specifications similar to the one inclosed, or under none at all. We have no city ordinance regulating such matters.

H.

SPECIFICATIONS TO GUIDE THE PLUMBER AND GAS FITTER IN THE WORK TO BE PERFORMED ON.....,

ALSO TINNERS' WORK TO BE DONE.

GAS PIPES ON FIRST FLOOR. The rooms on first floor to be provided with drop lights in the centre of ceilings. Kitchen, dining room and east chamber, or sitting room to have side lights as follows:—Kitchen one in partition, at the northwest corner of room. Dining room, one on the west wall, south of window. Sitting room to have one on *each* side of the chimney breast. Also parlor to have one on each side of chimney breast. Hall to have one drop light in ceiling in the centre, or as near as may not interfere with stairway.

GAS PIPES ON 2D FLOOR HALL AND IN OTHER ROOMS. Hall to have drop light in centre of the largest part. Other rooms to have drop lights in centres.

GENERAL REMARKS. The contractor to furnish all pipes, elbows, and T joints necessary to make a good, satisfactory job, and to place the pipes in the wall so they can be well covered with the plaster. Pipes to be best quality. All necessary excavation to be done by contractor. Work to be done as much as possible before the floors are laid. No fixtures included in contract.

WATER SUPPLY. All necessary excavations to be done by contractor deep enough to insure against frost, and in such place as to be least liable to freeze and gain the desired point of supply.

KITCHEN BOILER. Place and supply range boiler with proper pipes and connections to supply sink and wash bowl in northwest corner of kitchen,

BATH ROOM, ETC. as per plans; also furnish pipes to bath and wash bowl on second floor.

SINKS, 1ST FLOOR. Sink to be lined with zinc and have beneath, with lead pipe of proper diameter to carry off waste; also supply of warm and cold water brass cocks. Wash bowl supplied with warm and cold water brass cocks, waste Y trap; also furnish wash bowl in chamber on first floor on north side with necessary supply and waste. Marble top and top with back piece. Nickel trimmings.

2D FLOOR. Furnish tinned bath tub, 5 feet 6 inches long, and supply it with all necessary and nickel plated trimmings; also furnish marble wash basin in bath room with trimming, etc., to be placed as shown on plan.

HALL. Hall to have basin in corner as shown on plan, with supply, waste. Trimmings same as before mentioned.

REMARKS. The owner will furnish range, but the contractor must place the same where directed and furnish all other necessary appurtenances for hot and cold water supply and waste. Dig cesspool and lead waste pipes into it.

WATER CLOSET. Water closet furnished in bath room with all necessary appurtenances as selected by owner. The whole to be done in a good, substantial, workmanlike manner, and no advantage taken of any omission or discrepancy that may appear in this specification as this is intended to show the general idea of arrangement. All work to be tested and made satisfactory to owner.

Porch and bay window to be covered with good tin, flashed around posts and against the wall. The exposed door and window caps to be covered with tin and flashed against wall.

The owner reserves the right to reject any or all bids.

[It is creditable to the plumbers of your city that citizens get any good work done, especially if this memoranda is a fair specimen of the so-called specifications estimates are made on. If this owner paid to have a plumbing specification drawn, he has received nothing for his money; if he was unwilling to do so, and relies on this to secure a good job, it will be a wonder if he does not get fooled.]

PLANE OR PLAIN.

SPRINGFIELD, *May* 6, 1883.

To the Editor of THE SANITARY ENGINEER:

Will you settle the orthography of the term *plain* or *plane* surface, as applied to the outside surface of radiators?

In nearly all catalogues and other trade books it is spelled *plain*, but when used by writers it is generally *plane*. Why this difference?

An answer through your paper will settle a dispute, and may be of some importance to your readers.

Respectfully yours, STEAM FITTER.

[The difference evidently comes from the view taken of what plain or plane surface is.

The trade was long accustomed to a certain kind of heaters or coils made of pipe or castings, which was smooth, or nearly so, on the outside; but then the innovation came, and surfaces were put on the market which had projections on the outside surface, but too small to be "coredout" in the projection, and they were called "extended surfaces." Then the manufacturers of old styles of heating surface found it necessary to call their surface *plain*, to indicate it was ordinary or common.

But soon again surface was made and put on the market, which was not ordinary or common, as it was corrugated or extended in such a manner that the inside or coring of the casting followed the contour of the outside of the radiator, and which could not be said to be "extended surface" in the first acceptation of the word; nor was it the old kind, which had been called plain for the sake of distinction; but, nevertheless, it had the *distinction* which the advocates of the old school claimed as a point in favor of the pipe method—namely—that the inside or steam surface was the same, or nearly the same, as the outside surface, but as it was not *plain* it was called *plane*, to distinguish it from hilly or uneven surface.

Thus, pipe may be called *plain* or *plane* surface, while irregular shaped surface may be either *plane* or *extended*, according to how the coring is done; but if the coring does not follow the shape of the outside it is *extended*, therefore, all that is not extended may be called *plane*.]

BOILER CIRCULATION.

KANSAS CITY, MO., *May* 10, 1883.

To the Editor of THE SANITARY ENGINEER:

In the last few numbers of your paper, I have noticed some sketches on hot water circulation, the last being by J. T. Armstrong, Keene, N. H. My experience with a

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job of that kind, would lead me to believe, that the only time he would get hot water at any point from boiler would be when the fire made steam enough to force water through hot water pipes to tank, he then might obtain hot water at furthest point.

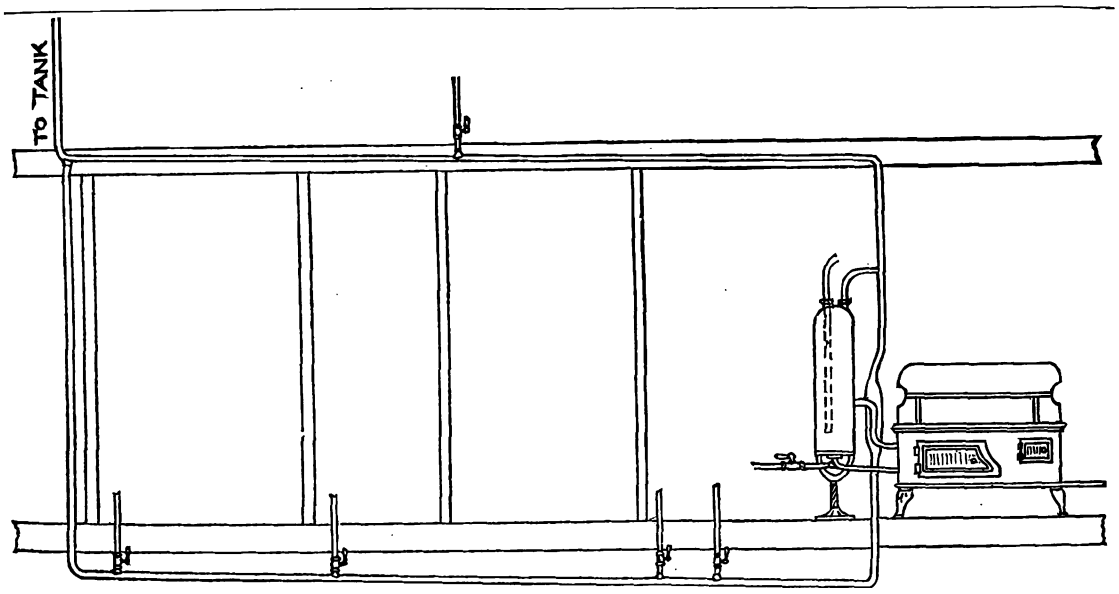
In this city where the hydrant water is not very good, cistern water is used very much, and as rains do not come when wanted, the water is used carefully.

Inclosed find sketch of a job I did, when it was necessary to have hot water circulate below boiler, also draw hot water at fixtures below. Most of the fixtures are on ground floor; it is 65 feet from boiler to furthest fixture. The sketch only shows hot water pipe; an expansion pipe is taken off at highest point to tank. I only use one pipe as hot water and circulating pipe, and there are no check valves to interrupt circulation.

The small sketch shows what I believe to be a new contrivance for forcing a circulation, at least, I have never heard of one before. *A A* 1-inch copper from boiler to stove. *B B* 2 inch jacket around same, water from hot water pipe passes through *B*, and is heated by hot water passing through *A* from water back to boiler. Circulation is started as soon as fire is kindled. If there is any hot water in boiler it can be drawn at once. It does not matter how the water runs from boiler, as it must come out of top of boiler. Do you know of any better way of circulating and drawing hot water below boiler? Yours truly,

JOHN A. RONEY.

[We have no reason to suppose that J. T. Armstrong does not get warm water at all the warm water faucets in a reasonable time after the fire is started or that the supply is not continuous.



The experiences of others also go to prove that dipping all the pipes below the kitchen floor can be made practicable under certain conditions.

The condition required is, the sum of the weights of the water in the ascending columns must not be less than in the descending. The covering of all the ascending pipes with a good non-condnctor, and the exposure of all the descending pipes will assist the circulation.

Your arrangement of jacketing the pipe from the waterback to the boiler, we think will allow a person at a basin to get a certain quantity of water (warm) by drawing slowly in a much shorter time after the fire is started, but should a considerable quantity of water be required, then the draught will come on the boiler delivering water no hotter than in any ordinary case. But aside from that, we think it will quicken the circulation only in proportion as it prevents loss of heat to the air in an ascending pipe; but the question then arises may not the return water which is naturally colder than the outgoing counteract or more than counteract the gain from excluding the air from the pipe?]

THE HYGIENIC EXHIBITION AT BERLIN.

The Hygienic Exhibition was formally opened May 12, by the Crown Prince, Frederick William. A large number of State and city officials and many deputations were present at the ceremony. The Crown Prince expressed the thanks of the Emperor to the exhibition committee and to its promoters generally, and extended a hearty welcome to the foreign commissioners. He hoped that the exhibition would prove a success, as its object is to benefit humanity of all nations. The remarks of the Crown Prince were greeted with great enthusiasm. The building has just been completed and is erected on a scale far superior to the one which was burned down last year. It displays a large collection of articles for the preservation.

AMERICAN PRACTICE IN WARMING BUILDINGS BY STEAM.*

BY THE LATE ROBERT BRIGGS, M. INST. C.E.

(Continued from page 582.)

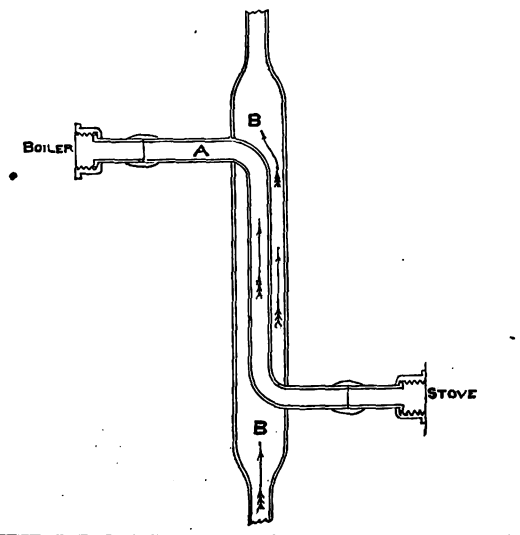
Radiators for diffusing heat.—In respect to the radiating surfaces for the diffusion of the heat, there are three distinct classes of warming apparatus in use in America, according to the object to be effected.

First, there is the apparatus for warming the rooms by so-called direct radiation; that is, by means of radiating surfaces exposed in the rooms themselves.

Secondly, there is the apparatus for what is sometimes called indirect warming, by means of currents of air; the heated surfaces are placed in a chamber, through which a limited supply of air is allowed to pass on its way into the room. In neither of these two methods is the warming accompanied by any systematic ventilation.

Thirdly, there is the apparatus for both warming and ventilating, arranged so that the warming shall take effect upon the whole supply of air admitted for ventilation.

The first and second methods are, withr are exceptions, employed for all dwellings, offices, and mills; the third is reserved for hospitals, asylums, public buildings, and the like. On the first and second plans the warming apparatus is required to be capable of maintaining a comfortable warmth in the very coldest weather, when the outdoor



temperature ranges as low as 15° below zero Fahrenheit; whence it is argued in favor of these two methods that in moderately cold weather their warming capacity will be so largely in excess as to admit of ample ventilation by opening windows or doors at pleasure. There are some who condemn altogether the first method or direct radiation, and strongly recommend the second or indirect, on the ground of the supply of fresh air secured by the warming currents in the latter method. But, as a rule, this supply of fresh air is inadequate; and with the prevalent construction of apparatus, the temperature of the warming currents on issuing from the heating chambers is too high, and cannot be controlled; and the regulation of the warmth in the room has to be effected by opening wider or partially closing the hot-air inlet from the heating chamber into the room, thereby altering the admission of fresh air. On the score of ventilation, the second method is perhaps preferable to the first, because for any temperature of the external air the second method does certainly supply some admission of fresh air, however varying and inadequate. But in the estimation of the community at large, the first method—direct radiation from surfaces exposed in the room itself—offers the pre-eminent advantage that the warming of a room is effected with great certainty and rapidity, and is under the immediate control of the occupant. Direct radiation has also the merit of requiring the smallest consumption of fuel; and although the cost of the apparatus is increased by the superior finish required for the radiators, which are here exposed to view, and by the greater length and complication of the mains, in comparison with the indirect method, yet the increase is about counterbalanced by the saving in extent of radiating surface and in diameter of mains with the direct system; and the special constructions of heating chambers, flues, and dampers, attending the indirect system, make the latter the more costly mode of warming any building.

The conditions of American ventilation and warming, in relation to health and comfort, differ materially from those prevailing for the same latitudes in Great Britain and other western parts of Europe. The temperature agreeable to Americans in cold weather* is about 70° Fahrenheit on the Atlantic coast, rising to 80° or 85° for inland localities and for the severest and driest cold. The American and European requirements differ therefore so completely, that in the tables given in the appendix no attempt has been made to establish any relation between the area of radiating surface in the warming apparatus and the extent of building to be warmed, whether as regards floor area, outside surface of walls or roof, and cubic capacity, or in connection with ventilation for varying numbers of persons or of lights; the tables are presumed to be equally applicable to data derived from experience on either side of the Atlantic.

In the buildings warmed in America by direct radiation there is generally no provision whatever of air-flues, either inlet or outlet, to aid ventilation. This is true for dwelling rooms, offices, and mill or factory rooms. Recently in many of the better living-rooms, and in offices also, open fire-places have been built, mainly for show, but possessing some utility in producing a little radiating heat for speedy warming. Fire-places, while valuable for ventilation, are chiefly important from the advantages they offer for the attainment of an equable temperature throughout a room. The outlet aperture in any room must be at or near the floor, at any rate in cold weather, so as to remove the air from the bottom of the room where it is coolest. Although the fouler air is of course at the top of every warm room, yet the discomfort consequent upon removing the warmer air from the top, and allowing the cooler air to stagnate below, is found too serious to be endured. A healthy atmosphere would indeed be maintained throughout the room, provided that, in removing air enough from the top, care were taken to supply an equal quantity of fresh air by a diffused admission suitably arranged for comfort; but complete ventilation will always fail to receive due consideration wherever it clashes with comfortable warmth. Gas lights are used, to the exclusion of all others, in American dwellings; and no inconvenience or unhealthiness is considered to result from the unventilated burners. It is fully recognized that the vitiation of air by the combustion of gas is not organic; and although, when the products of combustion are in excess, the air becomes unbreathable, it is by no means the source of disease.

In warming a room by direct radiation, the proper situation of the radiating surface for the attainment of an equable temperature is in some respects a moot question. As long ago as 1846 Dr. Morrell Wyman † called attention to the way in which heat was distributed in any room, when the source of heat was situated as usual at the back of the room, against an inner wall, with windows and exposed outside wall at the front or side of the room; and he showed that a layer of highly heated air collected next the ceiling

*A paper read before the Institution of Civil Engineers, November 28, 1882.

* This branch of the question was touched upon by the author in a paper read before the American Institute of Architects at their Boston meeting in October, 1877, and reprinted in January, 1878, in the "Quarterly Journal of Science."

† Dr. Wyman published in Boston, in 1846, "A practical treatise on Ventilation and Warming," containing much of novelty at the time and of lasting excellence. The work, now out of print, is as suggestive as Walker's "Hints on Ventilation," with which it may be compared.

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whence descended a sheet of air along the cooler wall and window surfaces, becoming itself cooled in its descent, until at about the height of a man, a uniform temperature of comfortable warmth was established throughout the room. It is in conformity with this principal that, in the practice of warming in America by means of a hot-air furnace, the hot-air flues from the furnace are generally led up inside an inner wall, remote from windows or outside walls, and a tolerably equable and comfortable warmth is obtained by admitting into the room a limited quantity of very hot air, sometimes nearly as hot as 400° at the inlet. A closed stove, situated likewise against an inner wall, proves similarly effective; but with an open fire the draught of cold air, which from some source or other takes its course along the floor to the fire-place, seriously impairs the desirable uniformity of temperature in a room.

In warming by steam with direct radiating surfaces, the practice for many years was to arrange the steam pipes in lines or groups, called coils, along the bottom of the outside walls or under the windows. But present usage seems to indicate that better results can be obtained by placing the radiating surface where it will apparently be warming what is already the hottest part of the room; in reality it then promotes the natural circulation, whereby the proper diffusion of the warmth is aided, instead of being retarded. For warming rooms in mills, the most recent practice is to place the direct radiating pipes in rows overhead, suspended a foot or two from the ceiling, and two or three feet from the outside walls. Although by this arrangement the heat would apparently be expended in the top of the room, yet very satisfactory results are thereby obtained, in regard both to equability of warming and to efficiency of radiating surface.

In rooms warmed by direct radiation, the attempt has repeatedly been made to effect the ventilation by admitting air direct upon the radiating surfaces which are then placed under the windows, so as to intercept any descending currents of cooled air. Not much success has attended this plan, inasmuch as through some of the inlet apertures outward currents of warm air are then apt to escape from the room, producing no perceptible warming of the external air; while through others a flood of cold air enters from the outside, and, passing only some one coil or radiator, gets hardly warmed at all, the effect being far from comfortable.

[To be Continued.]

In a few days the Secretary of the Interior will promulgate a series of regulations to govern the importation of sugar.

On May 18 a bill passed the Michigan Legislature to amend an act to establish a State Board of Health and to provide for the appointment of a superintendent of vital statistics, and to assign certain duties to local boards of health.

Small-pox is developing to an alarming extent in Jacksonville, Ga. It is especially confined to negroes.

The London Sanitary Assurance Association, is going to recommend legislation which will compel builders of new dwellings to obtain a certificate from some authority as to their sanitary condition before such buildings can be inhabited.

Nothing has been definitely settled yet by the local steamboat inspectors as to what they will do with regard to the present method of storing gas, used in illuminating ferry-boats. Engineers of the ferry-boat companies are drawing plans which will be submitted to them in the course of a week. Action will then be taken upon them by the inspectors.

Louisville, Ky., has been selected for the tenth annual meeting of the National Conference of Charities and Corrections, which begins the 24th of September next. This year charity organization in cities, which as our readers know has been of the subjects to which most attention has been directed in this city, under the lead of Mrs. J. R. Lowell, and other earnest women and men, will be a special subject of discussion. Charitable penal and reform institutions are invited to have representations at this conference.

Food and Drugs.

ADULTERATED TEA.

The recent action of the State Board of Health in stopping a sale of "faced" teas has naturally led to the inqury whether this action indicates the future policy of the Board.

In other words, is the sale of faced teas to be looked upon as a violation of the Food and Drug Act, and as such prohibited?

The practice of adding a certain amount of coloring matter to the tea-leaf for the purpose of improving its appearance is so common, and of so long standing, that it is hardly to be wondered at that many should ask whether such a practice is to be prohibited.

The law distinctly states that an article of food is adulterated "if it be colored, or coated, or polished, or powdered, whereby damage is concealed, or it is made to appear better than it really is, or of greater value." There can be no doubt, therefore, that the practice of facing tea, or the sale of an article so treated, is a violation of the law, and any person violating the law is liable to prosecution.

The law, however, gives the Board of Health the power to declare certain articles exempt, and to establish standards. Some time ago the dealers in coffee and in mustard applied to the Board for permission to sell mixtures of these articles. The Board thereupon declared certain mixtures of coffee and of mustard to be exempt from the provisions of the law, and established certain conditions to be observed in the sale of these articles.

If tea importers and dealers wish a like privilege they should apply to the Board without delay. It would seem reasonable that the Board will not make any exemption until the tea merchants have applied for one.

If there are any good reasons why faced teas should be sold, or if there is any practicable way of determining what in the way of facing is allowable, and what may be prohibited, it should be made known. Tea merchants, therefore, if they desire that exemptions be made by the State Board of Health, will do well to get together and agree upon what they consider a proper standard. The Board will, do doubt, be glad to confer with them, and after due investigation accede to any demand that it considers just, proper and for the public interest. Meanwhile, under the laws of this State, the sale of all faced teas is illegal.

Two hundred and seventy packages of teas, intended for shipment to the coal districts of Pennsylvania, were seized in this city last week by Inspector Davies. The teas, know as *Chulan Ponchong*, were found to be adulterated with chulan berry. The importers made no contest, but shipped the whole lot back to London.

On May 26 another seizure of tea was made in New York under the act of March 2. The lot comprises 245 half chests of tea dust, styled fannings and siftings, of all colors and grades. Mr. J. R. Davies, the inspector, states that the Collector is now awaiting the decision of the importer, whether he will appeal from the assistant appraiser's decision, or whether he will export the teas without delay.

TEA ANALYSIS.

The following is the result of analysis of 418 pecks of Indian Teas, sold in this city May 25.

Extract	39,625
Total ash	5,427
Ash soluble in water	3,244
Ash insoluble in water	2,183
Ash insoluble in acid	0,137
Insoluble leaf	57,886
Tannic acid	18,868
Theine	3,140

No coloring and facing matters, nor foreign leaves or exhausted leaves were found.

THE PARIS LABORATORY FOR DETECTION OF ADULTERATION.

The following sketch of the operations of the Paris Municipal Laboratory is taken from the *Medical Press and Circular:*

This institution was established in 1881, and in it all qualitative analyses are made gratis, the reports being given in the following words: "Good, passable, bad (not injurious), bad (injurious)" A tradesman, whose place of business is pointed out as one in which adulterated articles are sold, is visited by two officers (inspectors).

They request to be allowed to examine the products on sale, and do so, both microscopically and chemically, on the spot, with the means they carry with them. If articles appear to be adulterated, two samples, one for examination at the laboratory, the other to be preserved in case of dispute, are taken and attested by the signatures of the tradesman and both officers.

Suspected samples can be lodged at the nearest bureau of police, by means of the prison van. Every article that enters the laboratory is analyzed quantitatively, the results, however, being only made known to the sender on payment of a fee, varying according to the nature of the substance, from five to thirty francs.

It is upon the figures obtained in this analysis the chief of the laboratory bases his opinion.

Each analysis is registered in a book for the purpose which remains at the laboratory and forms part of an important collection.

Photographic apparatus have been provided, affording the analysts the advantage of putting before the eyes of the jury and judges a palpable proof of the fraudulent adulteration, for instance in pepper, flour and confectionery, or showing them the presence of trichini, cysticerci, etc.

The cost of the laboratory amounts to [illegible] $25,000 thus divided:—

1 Director of the Laboratory	[illegible]
1 Sub-Director of the Laboratory	[illegible]
1 Analyst (1st class)	[illegible]
3 Analysts (2d class), £72 each	[illegible]
16 Inspectors (1st class), £105 each	[illegible]
16 Inspectors (2d class) £72 15s each	[illegible]
3 Employes, porters, " " "	[illegible]
General expenses,	[illegible]
Total	[illegible]

The rest of the sum is applied to the purchase of instruments, books, etc. Drugs are not liable to be analyzed at this laboratory. In France *Pharmaciens* can only be inspected by members of the School of Pharmacy, who alone have the right of entering into their *officines*. It is interesting to note the report for last year of M. Charles Girard, director of the establishment, as a sorry evidence of misplaced confidence in what the public swallow. In butter alone there were only eleven samples pure out of sixty-two examined. Preserved vegetables, on examination, showed the presence of copper in eleven out of thirty-five samples. Milk showed oat meal, white of egg, dextrine, sugar, brain matter, oils and fat. Wines showed oxide of lead, alum, salt salicylic acid, and sometimes arsenic in liquids colored with fuchsin. In the matter of wines, M. Charles Girard values the loss annually sustained by the treasury at more than £140,000.

Beer showed picric acid, gall, aloes, colocynth, cocculus indicus, cubeb mixed already for use, nux vomica and carbonate of soda, strychnine, bitter leaves, juniper, etc. The report even mentions, among various adulterating materials in different articles, rancid *fecula* manufactory. It is pleasant to find that the endeavors of the Laboratory have brought on a notable decrease in the number of adulterated articles sold in Paris and France generally.

The fruit dealers of New Orleans have made a proposition to the Board of Health, that if they are allowed to carry on the fruit trade between that city and Jamaica in the summer months, they will carry out the following rules:

First, that in trading the north side of the island shall alone be visited. Second, that they will send with each vessel a medical man to be chosen by the president of the Board of Health and paid by themselves. Third, that the purser of every vessel shall be acclimated to yellow fever. Fourth, that the doctor and purser alone shall first go ashore at each of the parts visited, on every trip, and if yellow fever be found to exist, the ships shall neither land nor receive cargo or passengers. Fifth, that the vessel shall be cleaned and disinfected in all cases before receiving cargo. Sixth, that the medical officer shall make and give to the quarantine physician of the complete absence of yellow fever from every port visited.

FLORIDA SHIP CANAL.

The Florida Ship Canal Company completed its organization May 9, and is ready for business. J. C. Brown, of Tennessee, is president, ex-Senator Windom, vice-president, George C. Gorham, secretary, S. T. Meyer, of the firm of Seligman & Co., of New York, treasurer, and Gen. Charles S. Stone, chief engineer. The Board of Directors comprises J. C. Brown, B. F. Butler, W. Windom, W. Mahone, Townsend Cox, of New York, Senator Jones, of Nevada, A. S. Mann, of Florida, Michael Jacobs, of New York, A. W. Jones, of Virginia, S. T. Meyer, Gov. W. E. Cameron and V. D. Grover. The capital stock is fixed at $60,000,000. About $10,000,000 has been divided among the incorporators and officials.—*Boston Herald.*

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Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas Light Company.	Manhattan Gas Light Company.	Metropolitan Gas Light Company.	Mutual Gas Light Company.	Municipal Gas Light Company.	Harlem Gas Light Company.
May 19.....	27.41	19.61	22.52	28.34	29 85	20.18

E. G. LOVE, Ph.D., *Gas Examiner.*

NEW YORK PLUMBING REGULATIONS.

The Board of Health of this city have now issued an improved edition of the rules and regulations governing plumbing, which incorporates changes already in the specifications issued by the Board, or which have been suggested by two years' experience of the inspectors and engineers of the Health Department. It will be observed that the changes make the regulations more clear and explicit, and in some cases now require what was before only recommended. Several important paragraphs have also been added. The practice of the Board in regard to stoneware pipe, expressed in their ruling last June, and found in the specifications, is now also incorporated into the rules and regulations; the weight of lead pipe is now defined; express provision is made for enlargement of trap vent pipes in high buildings; cisterns for water closets must be so fitted and adjusted as to prevent waste of water; the material of rain leaders, when inside the house, is fixed, and the grade of the house drain within both least and greatest limits of descent is determined. We give below a summary of these and other changes, and quote in full the new paragraphs:

Hereafter—"The drain, soil, and waste pipes, and the traps *must*, if practicable, be exposed to view for ready inspection at all times, and for convenience in repairing. When *necessarily* placed within partitions or in recesses of walls, soil and waste pipes *must* be covered with woodwork so fastened with screws as to be readily removed. In no case *shall* they be absolutely inaccessible."

"Shafts not less than three square feet in area are required in tenement houses, to ventilate interior water closets."

Iron pipe for house connections with the street sewer are now required only in "made" or "filled in" ground.

"Where the soil consists of a natural bed of loam, sand, or rock, the house-sewer may be of hard, salt-glazed and cylindrical earthenware pipe, laid on a smooth bottom, free from all projections of rock, and with the soil well rammed to prevent any settling of the pipe. Each section must be wetted before applying the cement, and the space between each hub and the small end of the next section must be completely and uniformly filled with the best hydraulic cement. Care must be taken to prevent any cement being forced into the drain to become an obstruction. No tempered-up cement shall be used. A straight edge must be used inside the pipe, and the different sections must be laid in perfect line on the bottom and sides. * * * Any house-drain or house-sewer put in and covered without due notice to the Health Department, must be uncovered for inspection at the direction of the Inspector."

A fresh air inlet of at least four inches in diameter is now required, "opening at or near the street curb or at a convenient place not less than four feet from the nearest window. No cold-air box for a furnace shall be so placed that it can by any possibility draw air from this inlet pipe. The inlet pipe should never be carried up to the roof inside or outside the house."

"No brick, sheet-metal, earthenware, or chimney flue shall be used as a sewer-ventilator, nor to ventilate any trap, drain, soil or waste pipe."

The extension above the roof of a soil or waste pipe receiving the discharge of fixtures on only one floor is not required.

"Soil, waste and vent pipes in an extension must be extended above the roof of the main building when otherwise they would open within twenty feet of the windows of the main house or the adjoining house."

"The minimum diameter of soil pipe permitted is four inches. A vertical waste pipe, into which a line of kitchen sinks discharge, must be at least two inches in diameter with one and a half inch branches."

"Where lead pipe is used to connect fixtures with vertical soil or waste pipes or to connect traps with vertical vent pipes, it must not be lighter than D pipe."

The large buildings for which extra heavy soil pipe is recommended are now defined to be those over sixty-five feet in height above the curb.

In place of the recommendation that "iron pipes, before being connected with fixtures, should have openings stopped, and be filled with water and allowed to stand twenty-four hours for inspection," the following is substituted:

"When required by an inspector from the Board of Health, the plumbing must be tested with the peppermint or the water test, by the plumber in the presence of the inspector, and all defective joints made tight, and other openings made impermeable to gases. Defective pipe discovered must be removed and replaced by sound pipe."

The following exception is made to the rule that all fixtures must be separately trapped: "where a sink and wash tubs immediately adjoin each other, the waste pipe from the tubs may be connected with the inlet side of the sink trap; in such a case the tub waste pipe is not required to be separately trapped."

The following paragraphs are new or entirely rewritten:

"Traps must be placed as near the fixtures as practicable, and in no case shall a trap be more than two feet from the fixtures.

"In no case shall the waste from a bath tub or other fixture be connected with a water closet trap."

"Traps must be protected from syphonage, and the waste pipe leading from them ventilated, by a special air pipe, in no case less than two inches in diameter, for water closet traps, and one inch and a half for other traps. Except in private dwellings, the vertical vent pipes for traps of water closets in buildings more than four stories in height must be at least three inches in diameter, with two-inch branches to each trap, and for traps of other fixtures not less than two inches in diameter, with branches one and a half inches in diameter, unless the trap is smaller, in which case the diameter of branch vent pipe must be at least equal to the diameter of the trap. In all cases vertical vent pipes must be of cast or wrought iron."

"Traps of fixtures near the fresh air inlet may be ventilated by being connected with it."

"No trap vent pipe shall be used as a waste or soil pipe."

"Overflow pipes from fixtures must, in each case, be connected on the inlet side of the trap."

"The sediment pipe from kitchen boilers must be connected on the inlet side of the sink trap."

"The valves of cisterns must be so fitted and adjusted as to prevent wasting of water, especially where cisterns are supplied from a tank on the roof."

"The overflow-pipes from water closet cisterns must discharge into an open sink or where its discharge will attract attention and indicate that waste of water is occurring, but not into the bowl of the water closet, not into the soil or waste pipe, nor into the drain or sewer. When the pressure of the Croton is not sufficient to supply these tanks a pump must be provided."

"When within the house the leader must be of cast-iron, with leaded joints; when outside of the house and connected with the house-drain it must be trapped beneath the ground or just inside of the wall, the trap being arranged in either case so as to prevent freezing. In every case where a leader opens near a window or a light shaft, it must be properly trapped at its base."

It is recommended that steam exhausts or flow-off pipes from steam boilers be discharged into a tank or condenser, "the waste from which, if to be discharged into the sewer through the house-drain, must be connected on the sewer side of the running trap."

The recommendation that yard drains be effectively trapped has been made a rule, and the following added: "Front area drains must, where practicable, be connected with the house-drain inside of the running trap."

The recommendation that cellar and foundation walls be rendered impervious to dampness has also been changed to a command, with the limiting clause, "where possible."

The following rules are all new:

"No privy vault or school sink will be allowed in any cellar or basement; nor shall the general privy accommodation of a tenement or lodging house be allowed to be in the cellar or basement."

"School sinks must be of cast-iron, not more than two feet in depth, connected at the upper end with the Croton supply, and at the lower end with a drain leading to the street-sewer, and provided with an outlet at the lowest point, and on the bottom so as to admit of a complete discharge of the contents whenever the outlet is opened and the sink flushed with water."

"The sink must be set so that the flange will be at least two feet below the yard surface, to prevent freezing. It must be at least ten feet from any window or as near that distance as practicable."

"The waste pipe from a hydrant sink in the yard must be properly trapped, especially where it discharges into a school sink, a privy vault, or cesspool, or the house drain."

"Open light and air courts must be properly drained."

"When a privy vault or cesspool must necessarily be used, and the water supply of the premises is from a well, they must be at least fifty feet from the well, and the privy vault must be absolutely tight."

AN ACKNOWLEDGMENT.

On the map of the subsurface irrigation work at Brynmawr, published at page 555, issue of May 17, should have appeared the name of Col. Geo. E. Waring, Jr., as the engineer who designed the scheme. The map from which our illustration was re-drawn made no mention of Col. Waring's connection with the work, nor were we advised of the fact. We cheerfully make the acknowledgment, therefore, now that our attention has been called to the omission. Its appearance in the same issue with Mr. Philbrick's article on the same subjects was without the latter's knowledge, and simply because we thought it of interest. The flush tank was made to hold ten thousand gallons.

RHODE ISLAND MASTER PLUMBERS.

PROVIDENCE, *May* 14, 1883.

To the Editor of THE SANITARY ENGINEER:

The first annual meeting of the Association of Master Plumbers of the State of Rhode Island and vicinity, was held at the Mechanics' Exchange, this city, April 26, 1883, and the following officers were elected: Thomas Phillips, President; Patrick Tierney, first Vice-President (second and third Vice-Presidents not elected); James C. Conroy, Recording Secretary; E. F. Carey, Corresponding Secretary; Patrick O'Connor, Treasurer; John Tierney, Seg't-at-Arms. Auditing Committee: George R. Phillips, Daniel Holmes, Wm. B. Thompson. License Committee: Geo. R. Phillips, Patrick Tierney, James C. Conroy.

We are in hopes to send three delegates to the national convention in June.

Little Rhody is never behind. We keep the ball moving. We never stop. Our motto is, "Onward and Upward."

Very truly, E. F. CAREY,
Corresponding Sec'y, 379 High St.

BOSTON PLUMBERS.

The Boston plumbers have organized a Master Plumbers' Association for that city and vicinity, and will be represented at the approaching convention in this city. The officers of the association are as follows: President, James Tucker; First Vice President, Isaac Riley; Second Vice President, Wm. Trainer; Third Vice President, Thomas J. Tute; Treasurer, T. H. Capper; Recording Secretary, Henry W. Tombs; Corresponding Secretary, James F. Davlin; Financial Secretary, John W. Cosden.

EXPLOSION IN A CESSPOOL.

We are indebted to a correspondent for the information that a gentleman in Columbus, Ohio, recently dropped a lighted match down the ventilating pipe of his dead-well, in order to see whether the water was draining off properly. The result was a sharp explosion, which blew the filth out of his house trap and frightened him into at once ordering sewer connections to be made and the well to be filled up. The well was about 40 feet from the house, received only the slops from the kitchen sink and the cistern overflow, and had no connection with the sewer.

WATER WASTE PREVENTION IN CINCINNATI.

The Committee on Water Works of the Cincinnati Board of Public Works, in their recent report recommending the purchase by the city of a perpetual right to the use of the Bell waterphone, present a considerable amount of interesting statistics regarding the decrease in the water consumption in that city since the introduction of the waterphone in 1881. With most of these our readers are already familiar. The present consumption *per capita* is given as about 55 gallons, while that of Chicago is stated to be 120 gallons; St. Louis, 75; Detroit, 130; Pittsburg, 102, and Boston 100, notwithstanding the "peculiar conditions for waste in the old water pipes and fittings," and the great demand by the hydraulic service, which alone takes over one-eighth of the whole supply.

From Fall River, comes the report that a plumber doing repairs in a beer saloon, opened a faucet to get a drink of water, and observing its rusty color, which he took for iron, let it run to clean itself, until the proprietor observed what he was about, and without ceremony ordered him to shut off that beer faucet.

Pall Mall Gazette says the Suez canal is in a fair way to become a stagnant sewer. The stations on its banks drain into it, it is never flushed, there is no tide and the stench is becoming unbearable.

The Mayor of New Orleans, on May 15, submitted a suggestion to the Council in reference to the improvement of the drainage of the city. It is said that the city is in great need of a general plan of drainage.

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Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and IT IS TO BE DISTINCTLY UNDERSTOOD THAT A NOTICE DOES NOT IMPLY APPROVAL. *No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.*

URINAL WITH OIL FLUSH.

[We give this illustration and translation as indicating a certain line of invention, with no idea that water will ever become so valuable as to make this substitute tolerable or practicable.]—ED.

For the following illustrations and descriptions we are indebted to the *Gesundheits Ingenieur* of March 15. The device consists of an arrangement for automatically flushing urinals with oil instead of water every time they are used. It is designed for places where the introduction or use of water is expensive, and it is claimed to be less odorous. Aemil Ritter, in Rostock, is the inventor and patentee. The following explanation of the drawings will make clear the operation of the apparatus:

A piston *d* is forced down into a cylinder *e* filled with oil by the person stepping upon the board *c*. The oil is at the same time pressed out through the pipe *g* into the channel *h*, from which it flows over and runs down the face plate *i*. The oil not only carries down the urine, but covers the plate with a coat of oil and prevents the adhesion of the urine. As soon as the pressure is taken off the board *c*, the spring *m* forces it up and raises the piston *d*, which by suction draws the

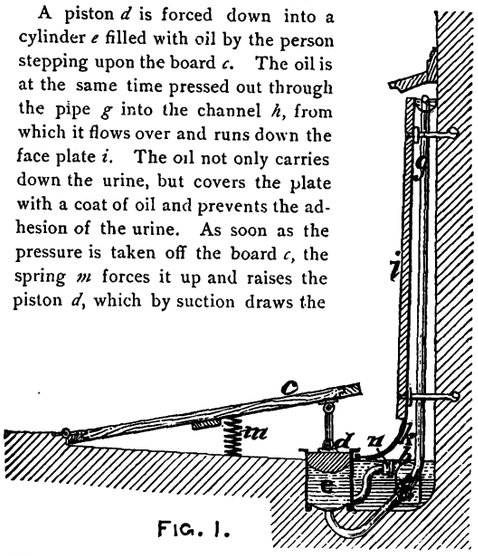

FIG. 1.

oil back into the cylinder. At the points *f* and *n* are valves which regulate the flow of the oil. When the piston descends, the valve *f* is opened, and at the same time the valve *n* closed. When it rises the valve *f* is closed, preventing the oil from flowing back, and the valve *n* opened, allowing the oil which has run down from the plate *i* to enter the cylinder and be used over again. Both the urine and the oil are collected in the

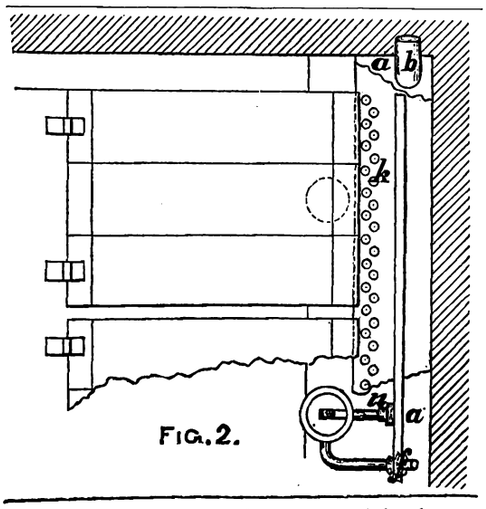

FIG. 2.

trough *a*, but the latter remains on top and thus forms a *perfect seal*. The urine flows off through the pipe *C*, which is bent downward like a gully trap to near the bottom, and thus prevents the oil from being drawn off. The same oil can be used over and over again, the only loss being from evaporation. To further insure disinfection, it has been found advisable to add carbolic acid to the oil.

Construction Notes.

WASHINGTON.—The farce now being enacted in the proceedings against Supervising Architect Hill of the Treasury Department are thus alluded to by a contemporary. "Mr. Murch is evidently about to commence beginning to begin to inaugurate an inquiry to ascertain whether or not he can find anything on file in the office of Supervising Architect Hill on which to base charges of misconduct against that official. Mr. Murch has been anxious to begin all the while for several months, but not being a lawyer, and not being allowed by the Secretary of the Treasury to have at government expense counsel, a clerk, an office, stationery, lights, ice water, and such, and not being furnished with papers that never existed, and not being given by law compulsory process for witnesses, and not being altogether clear in his mind as to what he had better start in on first, and divers other considerations him thereunto moving not to move, he has not yet got under that full headway which a longing public had been led to expect."

CHESAPEAKE BAY.—The following bids for iron work, Sandy Point caisson, were received by Major O. E. Babcock, U. S. A., May 19, 1883, at Sandy Point Shoal Lighthouse, Chesapeake Bay:

H. A. Ramsey, $6,900; Lewis Colwell, $6,300; The Southwark Foundry and Machine Works, $8,750; E. G. Smegser, $7,278; Phœnix Iron Co., $13,127.50; West Point Foundry, $6,190; Bartlett, Hayward & Co., $7,500; Pusey, Jones & Co., $11,340; Cooper Manufacturing Co., $9,000. Joseph M. Duclos, $7,390; Wendell Bollman, $5,142.15; Allentown Rolling Mills, $6,167.

QUEBEC.—The following bids for an extra supply of water for the city were opened at the meeting of the Water Committee of the City Council, May 15:

John P. Whelan, $594,000; R. R. McGreevy & Son, $495,000; Isadore Samson & Co., $435,000; H. Beemer, with six schemes, $400,000, $375,000, $440,000, $415,000, $535,000, $525,000; Michael Starr & Co., Ottowa, $400,000; W. McLea Millbank & Co., four schemes: $439,853, $538,925, $634,592, and $649,880; C. W. Carrier, six schemes: $428,391 for eight million gallons; $493,398, $460,712, steel pipe instead of iron; $460,000, $492,000, and two and one-half cents per pound for pipe; W. L. Scott, two schemes, $550,000 and $530,000. The Water Works Committee have recommended to the City Council to adopt the tender of Messrs. McLea, Milbank & Co., for constructing water pipes from Lorette, at $439,853.

COHOES, N. Y.—On May 17 a bill was signed by the Governor amending an act providing Cohoes with a larger water supply.

LANSINGBURGH, N. Y.—A bill was signed, on May 17, providing Lansingburgh with a supply of pure and wholesome water and with proper drainage.

PHILADELPHIA.—Select Councilman O'Rourke intends to execute his $15,900 contract with the Gas Trust for ditch digging, paving, etc., although it is claimed said contract between a member of Councils and the Trustees of the Gas Works is unlawful.

COLUMBIA, TENN.—New water works were begun here on May 22, to be completed by the middle of September.

TRENTON, N. J.—The following bids for furnishing work and materials for a gasometer, 30 feet diam. by 12 feet deep, were received by Charles B. Moore, Supervisor, May 23, for the New Jersey State Prison: Phœnix Iron Works, $1,975; McKenzie & Wilkes, $1,272. The contract has been awarded to McKenzie & Wilkes.

The following bids for furnishing and materials for an iron truss roof, were received by Charles B. Moore, May 23, for New Jersey State Prison: Phœnix Iron works, $1,300; McKenzie & Wilkes $1,075. The contract has been awarded to McKenzie & Wilkes.

The Commissioners of the District of Columbia have accepted the bid of the Maryland Paving Co. for furnishing 100,000 compressed asphalt paving blocks at $62 per 1,000. They have awarded the contracts for laying the asphalt pavements on the several streets of the city, heretofore mentioned, to the only two bidders there were—Messrs. H. L. Cranford and A. L. Barber.

Gen. Wright, chief of engineers, has approved the recommendation of Major Hains to reject the bids for filling in a portion of the Potomac flats in the vicinity of Easby's Point, and has requested the acting Secretary of War to find out from the Secretary of the Navy if permission can be obtained to cut down a portion of Observatory Hill, for the purpose of filling the flats. If there is no objection the work will probably be done under the direction of Major Hains at once, as it is desired to have some firm ground there on which to accumulate material for the sea wall, etc.

PHILADELPHIA, PA.—Proposals for the construction, erection and equipment of the following machinery were opened at the Water Department by the Water Committee of Council: For two, each 15,000,000 gallon, pumping engines for the Spring Garden Station; Holly Manufacturing Co., $134,000 for both; R. Wetherill & Co., $90,000 for both; H. R. Worthington, $81,000 for both; Southwark Machine Co., $88,950 for both; Gordon & Maxwell Co., $174,840 for both; Chas. E. Bigelow, $89,000 for both. For one 10,000,000 gallon pumping engine to be placed in the Frankford Station, W. Cramp & Sons, $49,500; Philadelphia Hydraulic Works, $42,500. For a 7,500,000 gallon pumping engine for the Roxborough Station: Knowles' Pumps Works, $[illegible]; Holly Manufacturing Co., $67,000; Robt. Wetherill & Co., $45,000; H. R. Worthington, $36,000; Gordon & Maxwell Co., $78,650.

The bids were referred to the Chief Engineer and the Committee on Extension.

The Distribution Committee of the gas works has recommended the purchase of 200 improved gas lamps to be used on Broad street, from Dickinson street to Montgomery avenue, from J. Dyoit, at $9 per lamp.

CINCINNATI, O.—Benjamin Barton is the lowest bidder for sewers in Fifth, Avery, Webb and other streets, at $16,771; in District 1, Division 3, Charles M. Steele is lowest, at $102,913. The contracts have been awarded to the above named parties.

CHICAGO.—Extensive contracts for curbing, filling, grading and paving streets have been let to J. B. Smith & Co., J. A. Sackley, Conway & McAdam, Mr. P. Gerrity.

Contracts for day service pipes in sundry streets were let, May 22, to A. J. McKean & Co.

One of the numerous companies experimenting in underground conduits in which to bury telegraph and telephone wires have just received a permit to operate in the principal "down town" streets, beginning at the Chamber of Commerce.

NEW YORK.—The Argentine Edison Light Company, formed to acquire the patents granted to Thomas A. Edison by the Argentine Republic, for his inventions relating to electric lighting, etc., and to manufacture, erect, maintain, etc., apparatus in said Argentine Republic, was incorporated May 17. Capital stock, $500,000.

CINCINNATI.—The Electric Burglar and Fire Alarm Co. of Cincinnati was incorporated May 15. Capital stock $100,000.

OHIO.—Were incorporated May 15: The Greenville Building Company, of Greenville; capital stock $[illegible]; The Patent Light Company, of Kent; capital stock, $[illegible] 000.

LOWELL, MASS.—The Lowell Telephone Syndicate, on May 18, closed the purchase of the Southwestern Bell Telegraph and Telephone Co., with a capital of $[illegible]. The price paid is understood to have been fifty dollars per share.

GOVERNMENT WORK.

Custom House and Post Office, Philadelphia, Pa., opened May 23, 1883. Synopsis of bids for encaustic tile floor, received under advt. of May 2, 1883:

Edward Roote, $13,550.00; U. S. Encaustic Tile Co., $10,890.00; Wm. L. Wilson, $10,292.00; American Encaustic Tile Co., $10,500.00; Sharpless & Walter, $[illegible] 300.00; John Gibson, $12,500.00.

Custom House and Post Office, Baltimore, Md., opened May 23, 1883. Synopsis of bids for iron work (columns, beams, etc.) received under advt. of May 8, 1883:

Haugh, Ketcham & Co., $6,578.31; Bartlett, Hayes & Hayward, 6,375.00; Wendell Bellman, $6,073.45; Jones & Co., on beams, $5,852.50; H. A. Vanderbecker, $6,[illegible]; Smead & Co., $7,058.96; Phœnix Iron Co, of Trenton, N. J., $7,913.79; H. A. Ramsey, $6,495.00.

The lowest bidder for furnishing marble window sills for the St. Louis, Mo., Custom House, was the Hickey Stone Co., $436; on glass for the Paducah, Ky., Custom House and Post Office, was De Paw, $899; on slate door plates for the Baltimore Custom House and Post Office, Francis Shenton, $190; on cut granite for entrance steps, buttresses, fence coping, street curb, etc., for the Albany Custom House and Post Office, Mt. Waldo Granite Co., $2,448 for steps, buttresses, etc., and $818 for street curb.

The water debt of Brooklyn, N. Y., is now $8,859,500, and an addition of $662,500 has been authorized. The sinking fund for the redemption of this debt is made up by an annual taxation on property of $50,000, and the revenues of the Water Department, over and above its expenditures. There is at this time, in the sinking fund, the sum of $2,443,609.98. The Commissioner of City Works calculates that to pay off the existing bonds, as they fall due, out of the Sinking Fund and its accumulations from taxation and accrued interest, will require a surplus revenue of $2,798,912.77 during the next 19 years, as in addition to this, the extension of the works must be provided for, to meet the increasing demand for water. Mr. Ropes thinks that the time has not arrived for a reduction of the water rents. In this connection the *Eagle* protests against the bills which are introduced into the Legislature from time to time, to furnish water to charitable institutions gratis, and takes the ground that persons who establish such institutions ought to maintain them, and not attempt to throw a part of the burden on the taxpayers.

The Board of Health in Canada will recommend to the government the desirability of introducing a special study of hygiene in all the public schools of Ontario.

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Reviews of Reports.

FOURTH ANNUAL REPORT OF THE BOARD OF HEALTH OF THE TAXING DISTRICT OF SHELBY COUNTY (City of Memphis), for the year 1882. By G. B. Thornton, M.D., President. 25 pp., 8vo. Memphis, 1883.

Dr. Thornton begins his report with the remark that the public health of the city for the past year has been better than for many years previous—certainly better than for either year since the organization of the Board in 1879. With reference to the statements which have been made in the daily press to the effect that the death rate of the city has increased since the construction of the sewers, and in consequence of them, Dr. Thornton makes an emphatic denial.

Admitting that the deaths of the city for the past two years have exceeded in number those of 1880, he explains this in part by the increase of population, and in part by atmospheric influences, which have caused a high mortality, not only in Memphis, but throughout West Tennessee, and in portions of States immediately adjacent. The number of deaths due to diphtheria, typhoid fever and scarlet fever during the last three years has been comparatively small.

As regards the sewers themselves, an extract from the report of Mr. Merriweather, the city engineer, informs us that the general system is composed of $34\frac{5}{10}$ miles of new sewers, with $4\frac{1}{10}$ miles of old sewers; $34\frac{8}{10}$ miles of subsoil drains, 4,715 water closets, 3,224 slop sinks, 179 urinals, 234 bath tubs, * * * 184 flush tanks, 36 manholes and 217 observation openings; the total cost to date being $263,136.16.

"The obstructions thus far for the two years have been altogether in the four and six inch laterals, a total of seventy-five; occasioned by sticks, rags, snuff bottles, sardine boxes, small tin cans, etc., all of which are improper substances, forbidden by law and ordinances.

"The entire cost attending the removal of these obstructions has been, for the last two years, $1,012.55. The main line sewers have never been entirely obstructed, but have had more or less of accumulations in them, requiring them to be cleaned with ball and rope on six occasions at given points where the gradients are very light; the cost of which has thus far been about $285.40 in the past two years.

"The system in the main has so far worked admirably, and has given entire satisfaction. It has, however, grown so rapidly, and now covers so much territory on the east and west side of Bayou Gayoso, that the main lines are at times taxed quite to their full capacity, showing that they will, in time, have to be enlarged at certain points.

"The new outlet, flowing directly into the Mississippi River, should be constructed as soon as assurance can be given that it will not be broken or interrupted by sudden radical changes in the course of the river in that vicinity. Until such assurance can be given, it would, in my judgment, be better to rely upon the present outlet."

The expenses of the Board of Health during the year amounted to $24,049.65, and the statement of work done shows that the city got its money's worth.

The report concludes with the recommendation that the remainder of the rotten wood pavement be removed and replaced with some kind of stone pavement, that the bayous be improved according to the plans of the Commissioner of the National Board of Health, and that the source of water supply be changed from Wolf River to the Mississippi.

We congratulate Dr. Thornton upon having produced a very interesting, instructive and practical report, and we recommend its careful perusal to all who are interested in questions of municipal sanitation.

TOTTENHAM SANITARY ASSOCIATION. Ninth Annual Report. 1882.

This little pamphlet of ten pages is mainly devoted to a discussion of the cause of the high death rate in Tottenham during 1882, as compared with that of preceding years or that of the other suburbs of London.

This high death rate is largely due to measles, scarlet fever, and diphtheria, and it is curious that the excessive mortality from these diseases is purely local and does not extend to the adjoining parishes. The committee are disposed to consider the system of sewerage as the cause of the trouble, but no evidence whatever is presented on this point.

As the object of the association is "to watch over the sanitary condition of the parish and to diffuse *sound information* on all matters connected therewith" [the italics are ours], it seems to us that such a charge against the sewer system should be based upon some facts or observations, and that these should be published. Upon the same ground we must object to the committee's method of estimating the population by taking the number of inhabited houses and multiplying it by the average number of persons per house as shown by the last census, instead of accepting the method of computation used by the Registrar-General.

The total expenses of the association during the year were about one hundred dollars, nearly one-half of which were for "election expenses."

BOOKS RECEIVED.

PRACTICAL CARPENTRY: being a Guide to the Correct Workings and Laying out of all kinds of Carpenters' and Joiners' Work. By Fred T. Hodgson. New York: The Industrial Publication Company, 1883.

ANNUAL REPORT OF THE DEPARTMENT OF CHARITIES AND CORRECTIONS OF KINGS COUNTY, for the year ending July 31, 1882.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store *b s dwell*, brown stone dwell; *apart house*, apartment house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder *fr*, frame.

NEW YORK CITY.

Greene st, No. 127, br and iron store; cost, $40,000; o, Emma D. Van Vleck; a, Wm. Baker....135 and 137 2d av, two br builds; cost, $75,000; o, Oswald Ottendorfer; a, Wm. Schickel....1st av, s e cor 54th st, brown stone flat and store; cost, $20,000; o and b, Lorenz Weiher; a, J. H. Valentine....1st av, e s, 25 s 54th st, three brown stone flats and store; cost, each, $18,000; o, b and a, same as last.... 6th av, s e cor 51st st, br store flat; cost, $30,000; o, Wm. Arras; a, Thom & Wilson; b, Jacob Vix & Son and John F. Moore....80th st, n s, 209 e Madison av, six brown stone dwels; cost, each, $16,000; o, Edward Kilpatrick; a, D. & J. Jardine....111th st, s s, 275 w 2d av, br ten and store; cost, $14,000; o, Josephine H. Jenny; a, A. Spence ....77th st, s s, 100 w 2d av, rear, br stable; cost, $7,000; o, Abraham H. Jonas; a, J. C. Burne....Boulevard, e s, 79.4 n 74th st, br club house and store; cost, $8,000; o, John D. Crimmins; a, D. J. MacRae ....122d st, s s, 100 e 7th av, eight brown stone dwels; cost, each, $18,000; o, Alonzo Teets; a, Cleverdon & Putzel....131st st, s s, 300 w 7th av, two brown stone dwels; cost, each, $10,000; o, Isaac E. Wright; a, Cleverdon & Putzel....128th st, n s, 100 e 5th av, four brown stone dwels; cost, each, $15,000; o, Isaac E. Wright; a, Cleverdon & Putzel.. .137th st, s s, 430 w 6th av, br and stone dwel; cost, $7,500; o, Wm. J. Chaloner; a, F. A. Peterson; b, J. B. Smith & Prodgers.

ALTERATIONS, NEW YORK CITY.

No. 20 West 59th st; cost, $10,000; o, Edwin A. Gibben and Dennis Beach; a, Douglas Smyth....117 Waverly pl; cost, $8,000; o, Delia M. Reynolds; a and b, H. M. Reynolds .. 120 West Broadway; cost, $4,000; o, Mary A, Manley; a, Jobst Hoffman ...419 5th av; cost, $20,000; o, H. A. Robbins; a, Stephen D. Hatch; b, R. S. Darragh & Co. and H. Gray....10th av, s e cor 153d st; cost, $10,000; o, Henry Webendorfer; a, F. W. Winterburn....Broadway, e s, 26th and 27th sts; cost, $3,200; o, Mrs. Paran Stevens....641 Lexington av; cost, $2.500; o, German Lese Verein; a, D. & J. Jardine....206 and 208 Fulton st; cost, $10,700; o, Martin B. Brown; b, Henry Wallace.... 6th av, s e cor 23d st; cost, $200,000; o, James D. Fish; a, E. H Kendall; b, W. A. Conover and A. G. Bogert & Bro....96 and 98 East Houston st; cost, $15,000; o, F. Krutina; a, J. Kastner.

BROOKLYN.

Eighth av, n w cor Lincoln pl, four brown stone dwels; cost, $22,000 each; o and a, William Flannagan....Clason av, e s, 81 n Douglass st, br school; cost, $20,000; o, Sisters of St. Josephs, Flushing, L. I.; a, J. Gilligan....Greene av, n s, about 200 e Tompkins av, three brown stone dwels; cost, $12,000; o, John Gregory; a, Isaac D. Reynolds.... 108, 110 and 112 Willow pl, about 200 s Clark st, three br dwels; cost, $60,000; o, Spencer Trask; a, Wm. Halsey Wood; b, P. J. Carlin and John Lee...6th av, n e cor Union st, brown stone dwel; cost, $15,000; o, Mrs. Mary Skelly; a and b, A. Wilson....13th st, n s, 347.10 e 4th av, br ten; cost, $3.500; o and c, J. W. Mount.

ALTERATIONS, BROOKLYN.

Kent av, s e cor Penn st; cost, $3,000; o, Chas. Reuschenburgh; b, Thos. Gibbons and Jenkins & Gillies... 420 Gates av; cost, $3,000; o, Paul C. Grening; a, Amzi Hill; b, Hadden & Kilduff and Samuel Walters.

BOSTON, MASS.—River View nr Adams st, 2 fr dwel; o, Wm. N. Fuller; b, James Pope....Lauriat av w Nortolk st, fr dwel; o, Geo. W. Goodale....Elm st n Ashley av, fr dwel; o, John Young; b, John Young....137 w 9th st, br dwel; o, James Rilley; b, Pat F. Hanlon....Greenwich pl w Commercial st, fr dwel; o, Timothy Hallahan; b, Edward Porter....135-137 Bunker Hill st, dwel & store; o, Michael Kelley; b, Edwin W. Archer....35-37 Monument st, fr dwel & stoie, o, same as last; b, same as last ...139 Bunker Hill st fr dwel and store; o, same as last; b, same as last....237 Lexington st, fr dwel; o, Paul Knowles; b, Joseph M. Towle....107 Walnut av; fr dwel; o, Wm. Donoldson; b, Wm. Donaldson....100 Jamaica st, fr dwel; o, Catherine Downey; b, James Gately ...Depot av cor Green st, b ten & store; o, Thos. P. Procter; b, Wm. A. Starns....Oxford Terrace 3 apartment houses; o, Nathan Mathews; b, Thos. R. White....42 & 44 A st, b dwel; o, Thos. Smith .... 1441-1443 Tremont st, b dwel & store; o, Emanuel Nathan; b, Gottlieb Merz ...Newbury st nr Chester park, b dwel & stable; o, Arthur Hunnerell.

CINCINNATI, OHIO.—Oliver nr Suier st, b dwel; cost $5,000; o, Chas. Kahn; b, Chas Kahn....Negleside place, b dwel; cost $15,000; o, Herman Urban; b, Stephen Richards....Hackberry cor Forest st, b dwel; cost $6,000; o, F. Trautman; b, H. Ringeman....Vine nr 12th st, b dwel; cost $15,000; o, H. Heack; b, H. Heack....Dandridge nr Frank st, br dwel; cost $5,300; o, Geo. Krone; b, Keramie & Rosenstiel....Lawrence nr 3d st, br dwel; cost $6,500; o, G. K. Bartholomew; b, Keramie & Rosenstiel....367 & 369 7th st, st dwel; cost $8,000; o, Wm. Glenn; b, same....Barr nr Cutter st, br dwel; cost $6,000; o, Wm. Glenn; b, same....Betts nr Cutter st, 2 br dwel; cost $6,000; o, S. J. Winnat; b, Stephen Richards.. Eastern av nr car stables br dwel; cost $7,000; o, Geo. Hoblins; b, LaKamp & Walfeck.

CHICAGO.—Wabash and 35th, br dwel, cost abt $41,000; o, Edward Leger; a, Burnham & Root; b, not let....Cor Groveland, Park pl and 28th st, br flats; cost abt $30,000; o, Jacob Rosenberg; a, Bauer & Hill; b, Muller & Schiel....117-123 State, br addition to store, cost $50,000; o, Mandel Bros; a, John Addison; b, Jonathan Clark & Wm. E. Barton....Washington boulevard, nr Robey, st and br apartment house, cost $12,000; o, H. Brassie, a, Albert Smith; b, Z. P. Jones....Walton pl, nr Dearborn av, st front dwell, cost abt $23,000; o, Mrs. Wright; a; Burnham & Root; b, not let ...Pine st, nr Chicago av, br and sl dwel, cost abt $45,000; o, J. Hall Dow; a, Burnham & Root; b, not let....Huron, nr Dearborn av, pressed br flats; cost $10,000; o, Peter Adler; a, Bauer & Hill; b, O'Connell & McGinness....67 Cass, dwel, cost $10,000; o, E. B. McCagg; a, Jno Addison....Cass, cor Chicago av, st and br dwel; cost $15,000; o, George P. Hawkins; a, John Addison; b, John Cox....Wood st, cor Ogden pl, br additional wing to Foundlings Home, cost $25,000; o, Board of Directors; a, Albert Smith; b, Louis Dalgling....Jackson, nr Ashland av, st and br dwel and barn, cost $10,000; o, W. D. Messenger; a, Albert Smith; b. not let.. .Warren av, nr Leavitt, st and br dwel, cost $7,000; o, Wm. Wakeman: a, same as last; b, not let....Cor Pine & Indiana, br and st flats; cost $32,000; o, W. M. Hoyt; a and b same as last....Dearborn av and Maple. pressed br porte cochere and stable connected, cost $5,000; o, a and b; same as last....412-422 Leavitt, six br dwel, cost $18,000; o, Campbell Bros; a, Edbrook & Burnham; b, Campbell Bros.... 353 and 355 Markfield av, two br dwel, cost $5,000; o, Busse & Brown... 238 and 240 Market, br warehouse. cost $30,000; o, J. C. McCullom; a, F. H. Waescher; b, Roessler & Winckler ... 149 and 151 Paulina, two brick dwellings; cost $5,400; owner, M. Horrigan....475 South Halsted, brick store and dwelling; cost $7,000; owner, Peter Becker....339-341 Ashland avenue, br dwel, cost $10,000; o, J. McLaren. ..736-740 Congress, two br dwel, $10,000; o, K. Eichengreen; a. A. Bessler. b, C. P. McKay ..110 Cornell, br dwel, cost $7,000, o, F. Prindiville.... 273 and 275 LaSalle av, br dwell, cost $15,000; o, Hammill & Congdon; a, Cobb & Frost; b, L. Weick....Rhodes av, nr 32d, six br dwel, cost $18,000; o, U. P. Smith; a, Wheelock & Clay; b, U. P. Smith....484 and 486 Larrobee, two br dwel, cost $11,000; o, Fred Krehm... 102 Jackson, br dwel, cost 5,000; o, D. Lane.... Clinton and Jackson, br market build, cost $9,000; o, James Dunn....Ashland av and Cornelia, br school; cost $42.000; o, City Board of Education; a, Jas. R. Willett; b, the city....Park av, cor Ashland av, six stone houses and one br apartment house, cost $22,000; o, J. M. Hull; a and b, H. R. Wilson... 150-156 W. Madison, st and b, store and theatre; cost $50,000; o, John M. Smyth; a, J. J. Eagan; b, Geo. Lehman & Co....S e cor Lake and LaSalle, br store, cost $60,000; o, Judge Lambert and Geo. M. High; a, Tree, Bauer & Hill; b, Muller & Schiel ...N w cor Wabash av and 18th st, br stores and flats, cost $45,000; o, Daniel Coey; a, W. W. Boyington; b, David Coey & Son.. 310-314 S. Leavitt, three br flats; cost $10,000; o, J. Webb; a, Elbrook & Burnham; b. Campbell Bros ..46-50 Wisconsin, three br dwels, cost $25,000 o, J. Cohen; a A. Bessler; b, C. McKay... 394 Webster, br dwel, cost $5,000; o, Jacob Roeder.

CLEVELAND, OHIO.—Sewing machine shop; cost $75,000; a, Leader Sewing Machine Co.; a, Rushmous & Seabury; b, not yet let.

CRAGIN, COOK CO., ILL.—Bl 4 stores, flats above, br; cost $8,000; o, Wm. Moran; a, Albert Smith; b, not let.

CHICAGO, ILL.—The $50,000 residence of the Archbishop of Chicago, on North avenue, overlooking the lake and Lincoln Park, is about done....In the principal parks five casinos, averaging $15,000 in cost, are being built this season....Architects are uniformly very busy and look for an end to the strikes soon.

DUBUQUE.—70 High st, br. school; cost $10,000; o, School District; a, John Mullaney.

HYDE PARK, ILL.—47th st, Chicago, 2 green stone dwel, s stones cost, abt, $40,000; o, Robert Straborn; a, Burnham & Root; b, not let.

KANSAS CITY.—Merriam Place, br and fr dwell; cost $5,000; o, C. S. Hasbrock; a, A. Van Brunt....Holmes, cor 11th st, six br dwells; cost $1,200 each; o, P. G. Estill.

PHILADELPHIA, PA.—Main and Pleasant st, two dwell; b, Lourison & Bro ...19 North 9th st, store and dwel; o, Fredk. Brill.... 225 Holman st, shirt factory; b, W. R. Brown... Mutter S. of Norris st, three dwel; b, A. M. Hoffman....Memphis and Norris three dwel; b, John Cairnes....Green & Queen st, three dwel; o, W. Keyser.. .Wolf W. of 6th st, seven dwel; b, W. J. Smith.... 4923-25 Little Wayne st, two dwel; o, Walker Stokes....Mutter S. of Sommerset st, three dwel; o, Jos. Hanson....Terrace ab Cedar st, two dwel; John Harper....Fleming bel Grape st, b, Henry Gray....Poplar & Carlisle st, two dwel; b, Jos. Stucky ....Otter E. of Memphis st, five dwel; o, Chas. Martain... Norris E. of Memphis st, five dwel....Brown W. of 27th st, 12 dwel; J. E. Ridgeway....Mifflin E. of Ridge ave, three dwel; b, Chas. Bantle....Warnoch S. of Columbia Ave, two dwel; C Bachle.

READING, PA.—48 Wrshington st, stone dwel; cost $10,000; o, I. A. Wilson; a, Jacoby... Washington and Thom st, br factory cost $6000; o, I. A. Wilson; a, Wm. A. Fink....Walnut and Poplar st, six dwells; cost $15,000; o, Schiller B. Asso'n; b, C. Fruntz....54 Pine st, br dwell; cost $5,000; J. Geise; a, C. Fruntz.

SPRINGFIELD, MASS.—Lyman st, alteration of bl with steam power; cost $10,000; o, Springfield Power Co.; a, Jason Perkins; b, C. L. Shaw....Main st, tenement block; cost $15,000; o, J. C. Parsons; a, none; b, owner.

WASHINGTON, D. C.—Penn av bet 22d and 23d st, br; cost $6,000; o, Blanche Lacey; a, Charles Denham & Co. .14th st extended, br, cost $5,000; o, J. G. Judd; a, F. G. Atkinson; b, John Shane.... D bet 13½ and 14th sts, w house and stable; cost $14,000; o, Union Transfer Co; a, Wilson & Bro.; b, Westerfield & Co....Cor 2d and B av, store room and stables; cost $15,000; o, G. W. Know; a, S. T. G. Morsell. There were some 50 permits in addition to the above for small houses and alterations, issued this week, and there are some 100 large buildings in contemplation, cost to range from $15 to $25,000, which are held in abeyance in consequence of the high price of labor and material. Bricks are very scarce and the yards find no trouble in selling all they can make.

WORCESTER, MASS.—Foster st, br block; cost $8,000; o, John O'Mara; b, J. Murphy....Union st, br block; cost $16,000; o, S. Salisbury; a, S. C. Earle; b, H. W. Eddy....Main st, fr dwel; cost $8,000; o, G. H. Harrington; a, J. B. Woodworth; b, J. B. Crosby.... Lafayette st, fr ten house; cost $8,000; o, Mrs. A. Martin; b, Edw Snyder....Eaton pl, br block; cost $9,000; o, Geo. Sessions; a, Barker & Nourse; b, B. C. Jaques....Hospital st, fr ten house; cost $5,000; o, E. B. Rogers; b, E. B. Rogers....Laurel st, fr dwel; cost $8,000; o, Phineas Ball; a, J. B. Woodworth; b, W. B. Howe.

MISCELLANEOUS.

The contracts for the new Presbyterian church, at Oneida, N. Y., have been let; total cost is about $35,000; architect, White, of Syracuse.

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REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MAY 19th, 1883.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of deaths.	Representing an annual death rate per 1,000 of	Number of deaths under 5 years.	Percentage of deaths under 5 years to total deaths.	Accidents.	Cerebro-spinal meningitis.	Consumption.	Croup.	Diarrhœal Diseases.	Diphtheria.	Erysipelas.	Fever. Typhoid.	Fever. Malarial.	Fever. Scarlet.	Acute Lung Diseases. Pneumonia.	Acute Lung Diseases. Congestion of Lungs.	Acute Lung Diseases. Bronchitis, acute.	Acute Lung Diseases. Pleurisy.	Measles.	Whooping Cough.	Smallpox.
NORTH ATLANTIC CITIES.																						
Portland.....Maine	34,519	13	19.5	1	7.7			2								1						
Boston.....Mass	407,581	175	22.3	60	34.4	2	1	29	1	4	8	1	2		2	26		10		11		
Cambridge.....Mass	57,432	26	23.5	10	38.4			1	1		4	1				5		1				
Worcester.....Mass	64,995	13	10.4	4	30.7	1		1			1					1				2		
Fall River.....Mass	60,126	24	20.7	10	41.6		3	2		2	1					3		1				
New Haven.....Conn	66,979	25	19.4	7	28.0			4		1			1		1	2				1		
Providence.....R. I	116,755	45	20.0	8	17.7	1		9	1	1	1	1	1		1	5						
Total	808,387	321	20.6	100	31.1	4	4	48	3	8	15	3	4		4	43		12		14	4	
EASTERN CITIES.																						
Albany.....New York	98,430	55	29.0	15	27.2	1		12								5	2					
New York.....New York	1,299,249	728	29.1	254	34.8	36	8	122	13	20	13	2	4	14	30	71		34		35	13	
Brooklyn.....New York	633,763	264	21.6	93	35.2	6		42	3		10		1			35	1	12	1	2	3	
Hudson Co.....New Jersey	228,025	103	23.4	31	30.0	15	1	13		1	2	1	2	1	4	10		1	1	1	8	
*Newark.....New Jersey																						
Camden.....New Jersey	54,012	8	7.7	2	25.0	1		2	1							2						
Paterson.....New Jersey	58,324	22	19.6	4	18.1			5						1		3		3				
Philadelphia.....Pa	907,043	344	24.9	121	35.1	6		43	4		13		6	2	6	35	7	10	1	2		
*Reading.....Pa																						
Wilmington.....Delaware	46,889	22	19.8	4	18.1	1		3							1							
Total	3,325,735	1,546	24.1	524	33.8	66	9	242	21	21	38	3	13	18	41	161	10	60	3	40	24	
LAKE CITIES.																						
Buffalo.....New York	168,702	93	28.7	33	35.4	4	1	10	1	1	4	2	3		7	10	3	5				
Rochester.....New York	92,116	30	16.9	6	20.0			3			1	1				5		2			1	
*Syracuse.....New York																						
*Cleveland.....Ohio																						
Detroit.....Michigan	131,118	55	21.8	23	41.8		2	4			9		1	1		5	2	1		1	1	
Chicago.....Illinois	597,834	198	17.2	99	50.0	5	2	21	3	5	6		2	1	10	15	1	13		1	6	
Milwaukee.....Wisconsin	135,233	51	19.6	31	60.7	2		3	3	3	3	1	3		3	4		1				
Total	1,125,003	427	19.7	192	44.9	11	5	41	7	9	23	4	9	2	20	39	6	22		2	8	
RIVER CITIES.																						
*Allegheny.....Pa																						
Pittsburgh.....Pa																						
Cincinnati.....Ohio	191,523	60	16.8	28	46.6	7	1	5		1		1	2		1	5	1	2	1	2	1	
Dayton.....Ohio	267,767	105	20.4	43	40.9	6	1	14	1	4			1		7		1	4		3	2	
Evansville.....Ind.	41,648	9	11.2	3	33.3	1		4														
*Louisville.....Ky	32,028	13	21.1	2	15.3	1		4								2		1				2
Indianapolis.....Indiana																						
Minneapolis.....Minn	86,529	26	15.6	4	15.3		1	3					1			2	1	1				1
*St. Paul.....Minn																						
*St. Louis.....Mo	98,026	21	11.1	8	38.0	1	3	2	1	2	2					4						
Total	717,521	234	16.9	88	37.6	16	6	32	2	7	2	1	4		8	13	3	8	1	5	3	3
PACIFIC CITIES.																						
SOUTHERN CITIES.																						
District of Columbia.....Wh.	136,471	49	18.7	11	22.5	2	1	7		3	1	1	1				2		1			
" .....Col.	71,103	28	20.4	9	32.2	1		5						1		1	1					
Richmond, Va.....Wh.	39,582	13	17.0	2	15.3		1	1		1				1		2					1	
" .....Col.	31,363	18	21.5	5	38.2			3								1						
Charleston, S. C.....Wh.	22,699	12	27.5	4	33.3			1								1						
" .....Col.	27,595	20	37.7	10	50.0			4		1			1			1						
Atlanta, Ga.....Wh.	25,583	12	24.4	4	33.3	1		3		2						1						
" .....Col.	19,221	20	54.1	10	50.0			4		4						1			4			
*Savannah, Ga.....Wh.																						
" .....Col.																						
Nashville, Tenn.....Wh.	31,993	9	14.6	2	22.2			2								1						
" .....Col.	19,406	12	32.1	4	33.8			1						1		3			2		2	
Memphis, Tenn.....Wh.	18,677	10	27.8	1	10.0			1		1												
" .....Col.	14,890	11	38.1	3	27.2			4		1				2								
*Mobile, Ala.....Wh.																						
" .....Col.																						
New Orleans, La.....Wh.	163,757	100	31.7	39	39.0	1	1	5	1	5	1	1	2	3	1	3		1			28	
" " .....Col.	59,866	67	57.8	26	38.9	1		6		2				4		2		1			24	
Total White	438,762	205	24.3	63	30.7	4	3	20	1	12	2	2	3	4	1	8	1	3		3	1	28
Total Colored	243,450	171	36.7	67	39.1	2		27		8			1	8		8	1	2		4		28
Total in 33 U. S. Cities	6,658,858	2,904	22.7	1,034	35.6	103	27	410	34	65	80	13	34	32	84	272	21	107	4	68	40	65
May 5—Total in 28 English Cities	8,620,975	3,580	21.7			122				50	21		54		76					81		6
May 5, " 8 Scotch Cities	1,233,088	592	25.0			14				14	4		4		5		132			38		
May 5, " 16 Irish Cities	854,731	508	30.9			7		79		11	2		5		11		105					1
April 21, " 168 German Cities	8,519,931	4,646	2.84	2,076	44.7	116		751	37	194	162		37		62		704			82	17	7

NOTICE.—All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

It is much to be regretted that so many cities fail to furnish weekly reports of deaths regularly. It not only spoils the table for the week, but it makes monthly comparisons very difficult. Registrars are respectfully requested to furnish reports for the weeks in which such reports have not been sent as shown by these tables, in order that monthly and quarterly summaries may be made

The populations in this table are calculated to the middle of the sixth half-year from the date of the taking of the last Census, that is, to March 1, 1883.

Notes and Abstracts.

Of an urban population of 6,658,858, there died during the week ending May 19, 2,904 persons, which is equivalent to an annual death rate of 22.7 per 1000.

For the North Atlantic cities the rate was 20.6; for the Eastern cities, 24.1; for the lake cities, 19.7; for the river cities, 16.9; and in the Southern cities, for the whites, 24 3, and for the colored, 36.7 per 1,000. Of the whole number of deaths, 35.6 per cent. were under five years of age.

Accidents caused 3.5 per cent. of all deaths. Consumption caused 14 per cent. of all deaths. In the North Atlantic cities it caused 14.7 in the Eastern cities 15.6; in the lake cities, 9.5; in the river cities 13.6, and in the Southern cities, for whites, 9.8, and for colored, 3.8 per cent.

Croup caused 1.1, diarrhœal diseases 2.2, and diphtheria 2.7 per cent. of all deaths.

In the Southern cities diarrhœal diseases caused over 5 per cent. of all deaths. In the North Atlantic cities diphtheria caused 4.6 in the Eastern cities 2.4; in the lake cities 5.3, and in the river cities 6 per cent., while in the Southern cities it caused none among the colored and 0.9 per cent. among the whites. Typhoid fever caused 1.1, malarial fever 1.1, and scarlet fever 2.8 per cent. of all deaths.

The highest rate from typhoid was in the lake cities (2.1), and the lowest in the Eastern cities (0.8). The highest rate from malarial fever was in the Southern cities, for the whites (4.6). The highest rate from scarlet fever was in the lake cities (7.0 per cent. of all deaths). Pneumonia caused 9.3, congestion of the lungs 5.7, and

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acute bronchitis 3 per cent. of all deaths. In the North Atlantic cities pneumonia caused 13.4, in the Eastern cities 13; in the lake cities 9.1; in the river cities 5.5, and in the Southern cities, for whites, 3.9; and for the colored 4.6 per cent.

Measles caused 2.3, puerperal diseases 1.3, small-pox 2.2, and whooping cough 6 per cent. of all deaths. The high mortality from whooping cough is among the Southern colored population, where it is 4.9 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis Jr. reports 41 new cases of diphtheria, 27 of scarlet fever, and five of typhoid fever.

LYNCHBURG, VA.—Dr. Thos. L. Walker reports scarlet fever in a mild form as very prevalent.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 18 new cases of scarlet fever and six of diphtheria. The reported cases under treatment May 19 were eight of diphtheria, and 55 of scarlet fever.

PITTSBURG, PA.—Dr. Snively reports one case of small-pox.

ROCK ISLAND, ILL.—Dr. G. G. Craig reports four deaths; under five years two; consumption caused one of the deaths.

DETROIT, MICH.—Dr. O. W. Wight reports 21 new cases of diphtheria, nine of scarlet fever and one of small-pox.

QUINCY, MASS.—Mr. Geo. L. Gill reports the prevalence of scarlet fever. During the week ending May 19, in a total of six deaths, four were caused by this disease.

NEW YORK CITY LUNATIC ASYLUM, BLACKWELL'S ISD.—Dr. T. M. Franklin, reports 1,378 insane patients remaining under treatment May 19. During the week the changes were, admissions 17, discharges five and deaths three.

PROVIDENCE, R. I.—Dr. E. M. Snow in his report for the week ending May 19, remarks, that "the number of deaths from pneumonia is quite large for the season, but will rapidly decrease when summer comes. There was one death from typhoid fever, the only one in in two weeks. The number of deaths during the week was about the average for the season, but will probably be less within the next five or six weeks. There is no epidemic of any disease in the city at the present time, and the evidences of malaria are much less prominent than at any previous time during the last year."

BALTIMORE, MD.—The Board of Health reports for the week ending May 19, shows 148 deaths; males 64, females 84; under five years 52, over 60 years 24. Small-pox caused five deaths, measles five, scarlet fever six, croup four, diphtheria seven, whooping cough none, erysipelas two, cerebro-spinal meningitis one, pneumonia four, bronchitis seven, congestion of lungs one, consumption 24, diarrhœal diseases two, typhoid fever one, malarial fever one, and violence 6. The annual death rates are reported as follows:—Whole population 18.81; white, 15.64; colored, 37.26.

MICHIGAN.—Dr. H. B. Baker, Secretary of the State Board of Health, reports the prevailing sickness of the week, ending May 12, as due to intermittent fevers, neuralgia, bronchitis, rheumatism, influenza, consumption, tonsilitis and measles. Diphtheria was reported present at 11 places, scarlet fever 16 places and measles at 31 places.

CAMDEN, N. J.—The report of Dr. H. F. Palm, for the week ending May 12, has been received. Deaths from all causes eight, under five years four. Consumption caused two deaths. No death was referred to any of the other diseases embraced in our table.

HUDSON CO., N. J.—The mortality rate in this county, for the month of April, rose 3.0 per thousand above the average rate for the corresponding months of the six preceding years. Lung diseases, according to C. J. Rooney, clerk of the county, constituted the principal causes of this increase. Consumption alone caused 67 deaths against an average of 38 in the six years and against a previous highest record of 45 deaths.

ONTARIO, CANADA.—The Provincial *Bulletin*, for the week ending May 12, shows a continued high degree of prevalence of bronchitis. Intermittent fever has increased and typho-malarial fever made its appearance. A decline from 7.1 to 4.2 per cent. has marked the progress of measles, whooping cough and diphtheria show an increase. Cerebro-spinal meningitis continues to increase in one of the sanitary districts.

SANTIAGO DE CUBA.—Consul John C. Landreau reports 17 cases of yellow fever, 11 of which were fatal during the month of April. The harbor and its vicinity is not infected.

ENGLAND AND WALES.—The return of the Registrar-General for the week ending May 5, shows the annual rate of mortality in the 28 large towns to have averaged 21.7 per 1,000. Bradford gave the lowest rate, 15.3; and Hull the highest, 31.1. No death was referred to any of the principal zymotic diseases in Wolverhampton, Derby or Halifax; whooping cough had its greatest mortality in Cardiff and Hull; measles in Sheffield, and scarlet fever in Sheffield and Leeds. The 21 deaths from diphtheria (see table) included 16 in London and two in Liverpool. Small-pox caused two deaths in London, two in Birmingham, one in Liverpool and one in Cardiff.

London.—Births 2,545; deaths 1,504. The births were 249 and the deaths 92 below the average numbers in the corresponding weeks of the past decade. The annual rate fell to 19.8. Small-pox caused two of the deaths, measles 55, scarlet fever 22, diphtheria 16, whooping cough 24, typhus three, typhoid fever nine, and diarrhœa and dysentery 17. The deaths from acute lung diseases which had declined from 672 to 445 in the five preceding weeks further fell to 371 during the week under notice, but exceeded the corrected average by 26; 198 were attributed to bronchitis, and 110 to pneumonia.

The report of the Registrar-General for the year 1882 has been received. The twenty-eight large towns included in the report comprise all the cities or municipal boroughs in which the population at the date of the last census numbered as many as 70,000 persons. The mortality rates for the aggregate was 22.3 per 1,000. Derby registered the lowest rate, 18.7 and Preston the highest 27.6. The highest annual death rates from measles, a disease from which the mortality was above the average of the preceding decade, were 1.71 in Blackburn, 1.61 in Sunderland and 1.57 in Bolton. The highest rates from scarlet fever were 1.67 in Hull, 1.45 in Nottingham and 1.42 in Sunderland. The highest rates from diphtheria were 0.82 in Portsmouth where 1.06 deaths ascribed to it, 0.25 in Cardiff and 0.22 in London. The highest rates from whooping cough were 1.20 in London, 1.11 in Brighton and 1.01 in Birkenhead. The mortality from diarrhœa, owing to the absence of continued heat in the summer, was generally below the average; the death rate from it, however, was 2.48 in Preston, 1.75 in Hull, and 1.66 in Leicester. The mortality from small-pox owing to the subsidence of the disease in London was much below the average, the rates from it were 0.39 in Newcastle, where it caused 57 deaths, and 0.26 in Nottingham, where 51 deaths were due to it.

In the 28 large towns 297,934 births and 187,931 deaths were registered, the former being equal to a rate of 35.3 per 1,000 and the latter to a rate of 22.3. Small-pox caused 675 deaths, measles 5,691, scarlet fever 4,679, diphtheria 1,330, whooping cough 7,600, fever 3,081, diarrhœa 7,194, and violence 6,160.

London.—Births, 133,200; deaths 82,905, equal to the respective rates 34.3 and 21.4. Small-pox caused 431 deaths, measles 2,329, scarlet fever 2,004, diphtheria 863, whooping cough 4,647, fever 1,117, diarrhœa 2,162, and violence 2,911.

SCOTLAND.—Consul J. A. Leonard sends report for the week ending May 5. The death-rate in the eight principal towns was 25.0 or 1.3 above that for the corresponding week of last year, but 2.6 below that for the previous week of the present year. Perth recorded the lowest rate, 15.3; and Paisley the highest, 35.3 per 1,000. Measles was the most fatal miasmatic disease, the mortality therefrom being greatest in Glasgow, where it caused 34 deaths. A slight increase is shown in the deaths from acute lung diseases.

EDINBURGH.—Deaths 74; rate 16.3. No death was recorded from small-pox, diphtheria or fever. Measles caused two deaths, scarlet fever and whooping cough, one each, diarrhœa five, acute lung diseases 14, and violence two.

IRELAND.—Consul A. B. Wood, of Belfast, transmits the return of the registrar-general for the week ending May 5, for a summary of which see table given above.

DUBLIN.—Births, 210; rate, 31.2; deaths, 222; rate, 33.00. No death was recorded from small-pox or measles. Scarlet fever caused two deaths, typhus and diphtheria, one each, typhoid fever and diarrhœal diseases two each, whooping cough 4, consumption 32, acute lung diseases 44 and violence four.

BELFAST.—Births, 140; rate, 34.0. Deaths, 146; rate, 35.5. No death was registered from measles or diphtheria. Small-pox caused one death, scarlet fever seven, typhus two, typhoid fever three, whooping cough six, diarrhœa six, consumption 26, acute lung diseases 30 and violence two.

PARIS, FRANCE—During the week ending May 10, there were 1,272 deaths; males 649, females 623; under five years 356, over 60 years 270. Typhoid fever caused 57 deaths, small-pox 13, measles 25, whooping cough 16, croup and diphtheria 43, scarlet fever two, dysentery one, erysipelas 3, puerperal fever seven, consumption 254, acute bronchitis 37, pneumonia 119, and violence 30. The annual rate for the week was 29.51.

On May 6, there remained under treatment in the hospitals of the city 107 cases of small-pox, 303 of typhoid fever, and 40 of diphtheria.

RHEIMS, FRANCE.—Consul John L. Frisbie reports 56 deaths during the week ending April 28; males 33, females 23; under five years 18, over 60 years 17. No death was registered from whooping cough, croup, diphtheria, puerperal fever, scarlet fever, typhoid fever or small-pox. Erysipelas caused one death, measles one, acute bronchitis two, broncho-pneumonia three, bronchial catarrh nine, pneumonia three, consumption seven, diarrhœa two and violence one. Annual mortality rate 31.03.

COPENHAGEN, DENMARK.—During the week which ended April 24 there were recorded 139 deaths; under five years, 54; over 60 years, 39. Annual mortality rate 28.1. No death was reported from small-pox, measles, croup, scarlet fever, typhoid fever or puerperal fever. Diphtheria caused two deaths, whooping cough six, diarrhœa seven, erysipelas one, consumption 10, pneumonia nine, pleurisy two, acute bronchitis five and violence two.

During the same week the following new cases were reported: Measles two, scarlet fever 10, diphtheria 14, croup five, whooping cough 47, typhoid fever four, diarrhœa 83, erysipelas 23, puerperal fever one, intermittent fever four, bronchial catarrh 252, pneumonia 76 and tonsilitis 108.

STOCKHOLM, SWEDEN.—Consul Elfwing reports 82 deaths during the week ending April 21; males 44, females 38; under five years 28, over 60 years 17. No death was reported from small-pox or scarlet fever. Measles caused two deaths, whooping cough one, puerperal fever one, diphtheria and croup three, tyyhoid fever two, diarrhœa six, consumption 11, pneumonia 11, bronchitis five and violence four. Annual mortality rate 24.5.

During the week ending April 28 there were reported new cases of disease as follows: measles 15, scarlet fever 26, erysipelas two, whooping cough five, croup four, diphtheria four, intermittent fever 11, typhoid fever six, tonsilitis 14, pneumonia 21, pleurisy five, bronchitis 57 and diarrhœa 25.

BRUSSELS, BELGIUM.—During the week ending April 28 there were 268 births and 223 deaths, equal to rates of 33.3 and 29.0. Of the decedents 90 were under five years of age. Small-pox caused seven deaths, measles two, diphtheria one, croup four, whooping cough three, diarrhœal diseases 22, bronchitis and pneumonia 40 and consumption 34.

GIBRALTAR, SPAIN.—Consul H. J. Sprague reports, under date of April 30, that six cases of small-pox were landed on that day from British S. S. "Gulf of St. Vincent," from Bombay, India. They were conveyed to the civil hospital for treatment.

VIENNA, AUSTRIA.—Consul-General Jas. K. Weaver reports 534 deaths as having occurred during the week ending April 28, which number is equivalent to an annual mortality rate of 37.0. Small-pox caused two deaths, measles none, scarlet fever three, diphtheria six, whooping cough 14, consumption 152 and acute lung diseases 99. The deaths under five years numbered 187.

FIRST ANNUAL REPORT OF THE PROVINCIAL BOARD OF HEALTH OF ONTARIO, being for the year 1882. XXXVI. 187 pp. 8vo. Toronto, 1883.

The act establishing the Provincial Board of Health of Ontario was passed in the spring of last year, and the first regular meeting of the Board was held on the ninth of May, 1882, the Secretary, Dr. Peter A. Bryce, having entered on his duties on the first of the same month. It at once set vigorously to work to inform itself as to the best means of performing the duties imposed upon it, and seems to have taken the State Board of Health of Michigan as a model in many respects.

The most interesting part of the volume to us is that which gives an account of investigations into the causes of the prevalence of intermittent fever, and of typhoid fever, in certain localities.

The first of these relates to typhoid fever in the town of Sarnia, where this disease has prevailed to a considerable extent since a general water supply was introduced into the town. When we learn that the supply main, which extends into the bay about 280 feet, is not more than 150 feet away from the point at which the main trunk sewer empties into the bay, this prevalence of typhoid is readily understood. All the houses are not connected with the water works, some being supplied by wells. In one such house, where typhoid fever had existed for months, water was found in the privy vault within two feet of the surface of the ground. The well was fifty feet from the privy, and the soil was a loose, sandy loam.

Another report relates to an outbreak of typhoid at Stratford, which seems to have been connected with very defective sewerage and polluted drinking water. The sewer in this case had little or no fall, and was of very defective construction, so that it became in fact a long cesspool.

Two investigations were made into cases of malarial prevalence. In the first, the main question was whether large accumulations of saw-dust on the edge of a river had anything to do with causing a very extensive epidemic of intermittent fever in the village of Coboconk. The case is thus stated:

"A village situated high and dry on a rocky island between two currents of an originally swift-flowing river, with high dry rocky banks on either side. A dam at the upper end of the island on the left and another dam at the lower end of the island in the right channel. A saw-mill on the right bank, with much saw-dust distributed along the bank and in the water along the shore. Complete immunity from ague up to a period one or two years after this mill was built and saw-dust had largely accumulated. This immunity is still almost complete in the farm houses a few hundred yards back from the river bank. At a point on the right bank, some hundred yards above the saw-mill, was a small marsh of several acres, but this marsh had existed for twenty years previous to the building of the saw-mill. Here the connection between the malaria and the accumulation of damp, decomposing saw-dust seems sufficiently shown to have warranted the conclusion that such accumulation must be stopped.

A more difficult problem was presented in an epidemic at Madoc, of a peculiarly severe type of malarial fever following the construction of dams, etc.

There was a large amount of swamp lands in the vicinity, there was a mill-pond in the town, and the water in the wells varied in height with that of the pond, and both are contaminated by soakage from privy vaults and cesspools. The commission concluded that while the swamp lands were probably the original cause of the malaria, yet their ill results had been aggravated by the unsanitary condition of the village, and that the first thing to be done was to insure local cleanliness.

The reports on the Sarnia and Madoc epidemics are illustrated with maps, and are good specimens of work.

The report of the president of the Board, Dr. Oldbright, has no map, and is therefore unintelligible to those not perfectly familiar with the locality.

The Board has engaged in the work of diffusing sanitary information among the people, by means of circulars, lectures, sanitary conventions, etc., a full account of all which is given in the report before us.

The work thus far accomplished, and this its first report, are certainly very creditable to the Board, and we hope that this is but the first of a long series of valuable contributions to the literature of public medicine.

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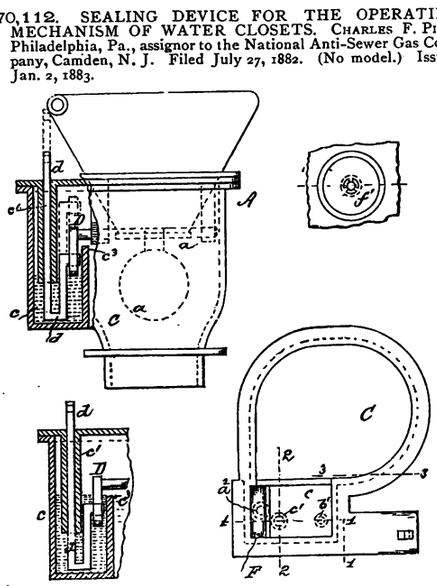
Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.]

[*Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.*]

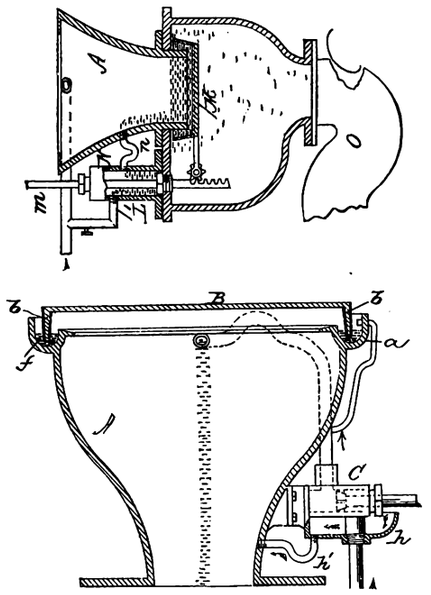
270,112. SEALING DEVICE FOR THE OPERATING MECHANISM OF WATER CLOSETS. CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Company, Camden, N. J. Filed July 27, 1882. (No model.) Issued Jan. 2, 1883.



Claim.—1. A water closet bowl and receiver, or container, provided with a pan or clapper, and mechanism for operating the same, which is sealed by a fluid seal, substantially as shown and described.

2. In a water closet, the combination of the following elements, viz.: a bowl, a receiver or container, a pan or clapper for said bowl, operating mechanism therefor, and a water supply pipe having branch leading into a receptacle or chamber to form a seal for said operating mechanism, substantially as shown and described.

270,113. WATER CLOSET. CHARLES F. PIKE, Philadelphia, Pa., assignor, by mesne assignments, to the National Anti-Sewer Gas Company, of New Jersey, Filed October 5, 1881. (No model.) Issued Jan. 2, 1883.



Claim.—1. In combination with a water closet bowl, a cap or cover, a water supply pipe and a valve therefor, constructed and arranged substantially as shown and described, whereby a stream or a flow of water is caused to continuously pass through the water supply pipe to form a running water seal between said bowl and the cap or cover, substantially as set forth.

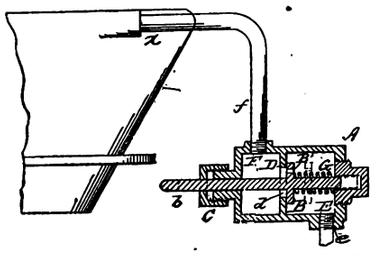
2. A water closet bowl provided with a sealing groove and a cap or cover designed and adapted to enter said groove, in combination with a water supply pipe furnished with a cock, constructed and arranged substantially as shown and described, whereby a stream of water will continuously pass through said pipe and into and out of said sealing groove, as and for the purpose set forth.

270,334. COCK FOR WATER CLOSETS. CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Company, Camden, N. J. Filed August 7, 1882. (No model.) Issued January 9, 1883.

Claim.—1. A cock for water closets, provided with two passage-ways, one larger than the other, the smaller of which is never closed, while the larger passage-way is adapted to be closed and opened at will, substantially as shown and described.

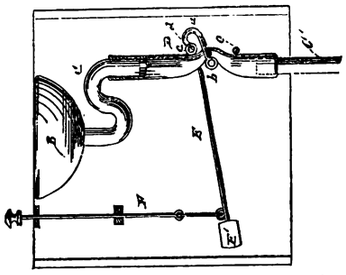
2. A cock for water closets, etc., provided with two passage-ways, one of which is always open for the passage of a continuous flow of water, while the other is adapted to be closed and opened at will for the passage of the flushing-water, substantially as shown and described.

3. A cock composed of a casing, a passage-way adapted to be closed by a valve having an operating stem and reacting mechanism, and an additional passage-way which is always open to permit a diminished continuous flow of water through the cock, substantially as shown and described.



4. A cock for water closets, composed of a casing, A, seat D, having opening *d*, spindle *b*, having pin *y*, valve B, and reacting mechanism G, substantially as shown and described.

270,211. WATER CLOSET SHUT OFF. JOHN FARTHING, Chicago, Ill. Filed Aug. 31, 1882. (No model.) Issued January 9, 1883.

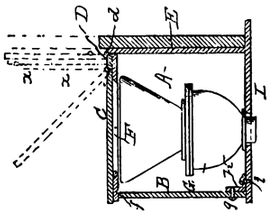


Claim.—1. The combination, with a bowl or receptacle and its discharge pipe or tube, of an interposed flexible connection, D, lever or arm E, having fork *a*, with a return, a^1, carrying a compression bar, *b*, and bars or rods *d e* for compressing the tube, substantially as and for the purposes specified.

2. The combination, with a bowl or receptacle and its discharge-pipes, or tubes, of a flexible tube, D, weighted arm or lever, E E^1, fork *a* a^1, bar *b*, and bars or rods *d e*, substantially as and for the purposes specified.

3. The combination, with a bowl or receptacle and its discharge pipe or tube, of the flexible tube D, arm or lever E, fork *a* a^1, bars or rods *b d e*, and lift F, substantially as and for the purposes specified.

270,333. CASINGS FOR WATER CLOSETS. CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Company, Camden, N. J. Filed July 31, 1881. (No model). Issued January 9, 1883.

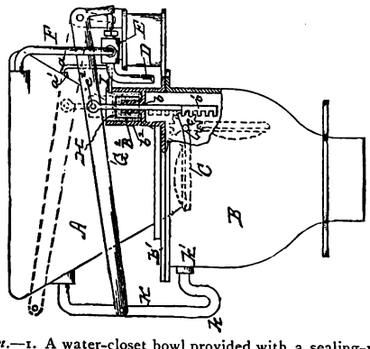


Claim.—1. A water closet casing or frame composed of removable parts or sections; whereby they may ber eadily placed in their normal positions and knocked down therefrom, substantially as shown and described.

2. A water closet frame or casing the sides and top of which are hinged together, substantially as shown and described, to permit of their being folded together, substantially as set forth

3. A water closet frame or casing the parts of which are hinged to one another so as to fold together, in combination with mechanism, substantially as shown and described, for retaining said parts in their normal position, as set forth.

270,335. WATER CLOSET. CHARLES P. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Company, Camden, N. J. Filed August 7, 1882. (No model.) Issued January 9, 1883.



Claim.—1. A water-closet bowl provided with a sealing-valve and a water supply pipe having a branch which leads into the bowl above said valve, in combination with an overflow-pipe, the lower end of which connects with the bowl below its sealing-valve, substantially as shown and described.

2. In combination with a water closet bowl, a clapper, C, operating mechanism therefor passing through a bearing in the container, a chamber surrounding said bearing, a water supply-pipe for the bowl, having a branch leading to said chamber, whereby a running water seal is provided for said bearing, substantially as shown and described.

3. A water-closet bowl provided with a sealing-valve, a water-supply pipe, a flushing pipe, an overflow-pipe, and a connection between the supply-pipe and bowl, whereby a flow of water continuously passes from said supply-pipe to the bowl, substantially as set forth.

4. The retainer or receiver B, having bearing or opening *b*, with slots b^1, in combination with inverted cup H, substantially as shown and described.

5. The combination, with a water-closet bowl, of cap E, flushing pipe F, supply-pipe D, and branch I, to form a running seal for said bowl, substantially as shown and described.

6. The combination, with a water closet bowl and sealing-valve, of water supply-pipe connections for the bowl, and a cap or cover therefor, arranged substantially as shown and described, whereby a running seal is provided for the bowl and for the operating mechanism of the sealing-valve, as set forth.

269,913. FORCE-PUMP. WILLIAM A. BICKFORD, Brantford, Ontario, Canada. Filed June 29, 1882. (No model.) Patented in Canada Oct 24, 1881, No. 13,594; extended Nov. 27, 1882, No. 15,858 and No. 15,859. Issued Jan. 2, 1883.

269,929. GAS APPARATUS. JOHN HANLON, New York, N. Y., assignor to the United Gas Improvement Company, Philadelphia, Pa. Filed July 10, 1882. (No model.) Issued Jan. 2, 1883.

269,931. GAS-BURNER. ALPHONSO S. HARRIS, Chelsea, Mass. Filed Nov. 27, 1882. (No model.) Issued Jan. 2, 1883.

269,933. INSULATOR FOR THE SUSPENSION OF ELECTRICAL WIRE CONDUCTORS. PAGET HIGGS and WILLIAM COURTENAY, New York, N. Y. Filed Dec. 31, 1881. (No model.) Issued Jan. 2, 1883.

269,937. ELECTRIC LAMP. CHARLES A. HUSSEY, New York, N. Y., assignor to the Hussey Electric Company, same place. Filed Jan. 21, 1882. (No model.) Issued Jan. 2, 1883.

269,938. ELECTRIC-ARC LAMP. CHARLES A. HUSSEY, New York, N. Y., assignor to the Hussey Electric Company, same place. Filed May 20, 1882. (No model.) Issued Jan. 2, 1883.

269,939. ELECTRIC-ARC LAMP. CHARLES A. HUSSEY, New York, N. Y., assignor to the Hussey Electric Company, same place. Filed May 23, 1882. (No model.) Issued Jan. 2, 1883.

269,950. OIL AND GAS STOVE. EDWARD A. MEYSENBURG, St. Louis, Mo., assignor to the Mascotte Stove Company, same place. Filed Mar. 2, 1882. (No model.) Issued Jan 2, 1883.

270,000. CALORIC-ENGINE. THOMAS BEESLEY, Muscatine, Iowa. Filed Apr. 19, 1882. (No model.) Issued Jan. 2, 1883.

270,009. STRAIGHT-WAY VALVE. DANIEL R. BURNS, Dayton, Ohio, assignor to himself and Albert L. Jackson, Washington, D. C. Filed May 26, 1882. (No model.) Issued January 2, 1883.

270,017. DYNAMO-ELECTRIC MACHINE. ALEXANDER CHERTEMPS and LOUIS DANDEN, Paris France. Filed October 5, 1882. (No model.) Patented in France Jan. 23, 1882, No. 147,003; in Belgium March 31, 1882, No. 57,494; in England April 12, 1882, No. 1,747, and in Italy, July 24, 1882, No. 14,434. Issued Jan. 2, 1883.

270,022. MACHINE FOR PREPARING TIN PLATES FOR ROOFING. ANDREW J. CONNOR, Louisville, Ky. Filed July 25, 1882. (No model). Issued Jan. 2, 1883.

270,053. STEAM RADIATOR. PATRICK GORMLY and LEWIS BRIDGE, Philadelphia, Pa. Filed October 9, 1882. (No model.) Issued Jan. 2, 1883.

270,064. HOSE-NOZZLE. FRANCIS HICKMAN, New York, N. Y. Filed April 19, 1882. (No model). Issued Jan. 2, 1883.

270,065. HOSE-COUPLING. FRANCIS HICKMAN, New York, N. Y. Filed April 19, 1882. (No model.) Issued Jan. 2, 1883.

270,097. HYDRAULIC CEMENT. JOHN MURPHY, Columbus, Ohio. Filed Sept. 20, 1882, (No specimens.) Issued January 2, 1883.

270,100. FURNACE GRATE. BERNHARD S. NIEBELL, Scranton, Pa. Filed Nov. 23, 1882. (No model.) Issued January 2, 1883.

270,102. PUMP VALVE. WILLIAM P. OLDEN, Springfield, Ill. Filed April 26, 1882. (No model.) Issued January 2, 1883.

270,127. HEATING FURNACE. DAVID W. ROBB, Amherst, Nova Scotia, Canada. Filed June 23, 1882. (No model.) Issued Jan. 2, 1883.

270,132. ILLUMINATING TILING FOR VAULTS, etc. C. HANSEN ROSS, Chicago, Ill., assignor of one-half to L. Otis Dauchy, same place. Filed Aug. 12, 1882. (No model.) Issued Jan. 2, 1883.

270,157. BOILER FURNACE. EZRA W. VANDUZEN, Newport, Ky. Filed May 6, 1882. (No model.) Issued Jan. 2, 1883.

270,181. GAS APPARATUS. HERBERT COTTRELL, Newark, N. J., assignor to the Automatic Gas Machine Company, same place. Filed July 28, 1882. (No model.) Issued Jan. 2, 1883.

270,191. VAPOR BURNER. CHARLES A. KOEHLER, Decatur, Ill. Filed April 10, 1882. (No model.) Issued Jan. 2, 1883.

270,194. VAPOR BURNER. T. TRASK WOODWARD, Pana, Ill., assignor to Duane T. Davis, same place. Filed Oct. 13, 1882. (No model.) Issued Jan. 2, 1883.

270,202 and 270,203. GAS ENGINE. JOHN CHARTER, Sterling, Ill. Filed July 5, 1882. (No model.) Issued January 9, 1883.

270,212. RETURN FLUE BOILER. CHARLES H. FITCH, New Haven, Conn. Filed Nov. 13, 1882. (No model.) Issued January 9, 1883.

270,280. DYNAMO ELECTRIC MACHINE. JOSEPH LEWIS, Chicago, Ill. Filed Apr. 3, 1882. (No model.) Issued January 9, 1883.

270,253. VAPOR BURNER. WILLIAM SCHERER, William A. MOLL and JAMES A. MARCH, Cleveland, Ohio; said Scherer and Moll assignors to said Marsh. Filed Jan. 29, 1882. (No model.) Issued January 9, 1883.

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Dr. C. W. Siemens has given a description of several electric railways to the Institution of Civil Engineers. The Lichterfelde line in Berlin has a gauge of 3 feet 3 inches, and is or nearly 1½ miles in length. It has been in operation since May 16, 1881. The line between Portrush and Bush Mills is six miles long. The two rails, which are 3 feet apart, are not insulated from the ground like the Berlin rails, but are joined electrically by means of copper staples, and form the return circuit, the current being conveyed to the car through a T-iron placed upon short standards, and insulated by means of insulated caps. At present power is produced by a steam-engine, but arrangements are in progress for the utilization of a waterfall by means of turbines. The line is to be extended to Dervock, six miles distant, so as to be brought into communication with some of the Ulster railways. Dr. Siemens believes that the electric system of propulsion is sufficiently advanced to be adapted for suburban tramways, elevated lines, and, above all, for lines through tunnels, such as the Metropolitan and District Railways. But he does not advocate its competition with the locomotive on main lines of railway.—*Metropolitan.*

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THOMAS HINDLEY & SON., Plumbing and House Furnishing, 794 Sixth Avenue, corner 45th Street. All matters connected with House Drainage receive our personal supervision.

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JAMES FAY, Plumber and Gas Fitter, 820 *Third* Avenue, corner 50th Street. Bath Tubs, Water Closets, Hydrants, Chandeliers, Brackets, etc.

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E. DUGGAN & CO., Sanitary Plumbers, 152 *W.* Broadway, solicit first-class work. Buildings fitted with brass, lead or iron pipe and ventilated according to the most modern system. Refers to Minot, Hooper & Co., 53 Leonard Street, and others.

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PASCO & PALMER, Plumbers, have water attached to the leading Modern Water Closets. Trap and Soil Pipe Ventilation shown for information of House Owners. 1293 Broadway, cor. 33d Street, N. Y.

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FRANK A. BROWN, *Treas.*, SALEM, MASS.

New Advertisements.

EMPLOYMENT WANTED. P. 616.

PROPOSALS. P. 616.

JNO. WILEY & SONS, New York. Publishers. P. 616.

THE SIXTH VOLUME OF THE SANITARY ENGINEER. P. 617.

THE J. L. MOTT IRON WORKS, New York. Sanitary Specialties. P. 623.

Wanted.

WANTED, by one of the New York city gas light companies, a man to superintend their gas fitting and meter departments. Must be an expert fitter, of good address, and a good manager.
Address, G. W. D., THE SANITARY ENGINEER office.

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ARNOLD & WENDT, Carpenters and Cabinet Makers. The fitting up of Bath Rooms, Water Closets, and Woodwork in connection with Plumbing a specialty. 142 Liberty St.

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HAYWARD & HUTCHINSON, 317 *Ninth St., n. w.*, give special attention to *Modernizing defective plumbing* in city residences, and, having a large force of competent workmen attend promptly to all jobbing orders.

Employment Wanted.

Under this head we will insert advertisements, not exceeding four lines, free of charge, for persons seeking employment. This privilege is restricted to persons employed by *Architects, Civil Engineers, Chemists, Electric Light Companies, Gas Companies, Plumbers and those engaged in the business of Heating by Hot Air, Hot Water and Steam.*

AN ANALYTICAL Chemist, in England, who has been for many years engaged in large alkali, artificial manure and other works, and has practical as well as theoretical knowledge of the manufacturing processes, wants an engagement in America as manager or chemist. Is a public analyst under the Food and Drugs Act.
Address, W. G., Jr., care of The Sanitary Engineer.

TO BOSS PLUMBERS.— A well-educated young man (21), now employed as book-keeper in a large manufactory, desires to learn Plumbing, Gas and Steam Fitting. Is large, strong, not afraid of hard work, and if wanted, willing to keep books at night. A 1 references. Address, G. M. W., this office.

A YOUNG man desires employment in some plumbing establishment, has had fourteen years' experience, desirous of obtaining employment where the German or French language is spoken.
H. B., Care SANITARY ENGINEER Office.
H. BEAR, 1,052 2d Av., City.

A FIRST-CLASS steam fitter wants steady work. Address,
JAMES MURPHY, 210 Pine St., Elizabethport, N. J.

A MIDDLE-AGED German, not long in this country, wants a position as plumber, steam or gas fitter, or roofer; can work independently on new or old work; has good recommendations. No objection to go into the country. Please address H. M., care of THE SANITARY ENGINEER, 140 William St.

A FIRST-CLASS Plumber desires a permanent position in either city or country; has had 12 years' experience in good sanitary work. References from the best New York city plumbers.
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SITUATION wanted by a married man (28), as Engineer; steady sober and attentive. Good references.
A. EATON, 65 McKibbin St., Brooklyn, E. D.

A YOUNG MAN desires a situation as plumber and gas fitter; can furnish good references. Address,
J. W. BROWN, 707 Warren Street, New York.

A GERMAN (25), learned mechanic, wants a situation as plumber; has first-class experience in setting up water-closets, baths, pumps and in gas fitting. Address,
FRANCIS HALBIG, 29 Stanton Street, New York.

WANTED.—Situation as plumber and book-keeper by a young man, aged 25, who has been in present situation 5½ years. Address, WM. S. KNIFFIN, 114 River Street, Hoboken, N. J.

A YOUNG MAN two years in plumbing trade, fair at wiping, desires opportunity to go jobbing under instructions. Address,
J. C., 81 Schenck Street, Brooklyn.

A PRACTICAL Steam Fitter and Mechanical Engineer who has had 14 years' experience in fitting up factories, etc., with gas, steam, water and the planting of machinery in general, desires a permanent situation in either a factory or a hotel.
Address, J. R., Yonkers, N. Y.

Proposals.

NOTICE TO BUILDERS OF WATER WORKS' PUMPING MACHINERY.

OFFICE OF THE COMPTROLLER,
CITY OF ALLEGHENY, PA., *May* 28, 1883.

Sealed proposals and specifications will be received at this office until 3 P. M., Monday, June 25, 1883, for the construction and erection of three four-million or two six-million pumping engines, to be located on Water Works property, River avenue, Eighth Ward, Allegheny, Pa.

The specifications will include all necessary excavating and masonry for foundations for pump well, also foundations for engines and engine house (the erection of pump house to be done by the city).

The pumping engines to be vertical with outside packed plunger pumps, and to be of a combined capacity of twelve-million gallons, pumped against a head of 220 feet in 24 hours, with a piston speed not exceeding 120 feet per minute.

The guaranteed duty must be given on the evaporation of the present boilers now in use at works.

The contractor must furnish specifications and detail drawings of engines, also plan of pump well and foundations for engines.

The whole to be erected and completed in eight months from signing of contract, in accordance with such plans as may be selected by the Superintendent of Water Works and approved by the Water Committee and Councils of the City of Allegheny, Pa.

No proposals will be considered unless in accordance with the above and accompanied by a bond equal in amount to the bid.

All information in regard to the above work will be furnished by Edward Armstrong, Superintendent of Water Works, City Hall, Allegheny, Pa.

The Committee on Water reserves the right to accept or reject any or all bids. JAMES BROWN, *Comptroller.*

PROPOSALS FOR ORDNANCE SUPPLIES.

PICCATINNY POWDER DEPOT,
DOVER, N. J., *May* 28, 1883.

Sealed proposals, upon the blank forms furnished from this office only, will be received by the undersigned until 12 o'clock M., on Thursday, June 28, 1883, for furnishing the supplies, in such quantities and at such times during the fiscal year ending June 30, 1884, as the commanding officer of this depot may require, viz.: Bricks, Lumber, Cement, Coal, Paints, Oils, Forage, Phosphates, Stationery, etc, etc.

A preference will be given to articles of domestic production. Catalogues giving the estimated quantities and articles required can be had on application at this office. Also, full information as to manner of bidding, conditions to be observed by bidders and terms of contract and payments.

The Government reserves the right to reject any or all bids.
J. P. FARLEY, *Major of Ordnance.*

PROPOSALS FOR STEAM-HEATING APPARATUS FOR FIRE PROOF BUILDING FOR PENSION OFFICE ON JUDICIARY SQUARE.

OFFICE SUPERVISING ENGINEER & ARCHITECT, 1316 N ST., N. W.
WASHINGTON, D. C. *May* 21, 1883.

Sealed proposals are invited from engineers and firms engaged in this business, for making, delivering and setting up in complete working order, a low pressure steam heating apparatus, for heating the new Pension Building on Judiciary Square, in Washington, D. C. The apparatus to be constructed in accordance with the requirements of the specifications, copies of which, and plans of the building, can be obtained at this office.

Bids should be addressed to the undersigned, and will be opened in the presence of bidders who may chose to be present, on the 25th of June, 1883. M. C. MEIGS.
Supervising Engineer and Architect.

PROPOSALS FOT IRON ROOFS, ETC., AT KANSAS CITY, MISSOURI.

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT,
WASHINGTON, D. C., *May* 19, 1883.

Sealed proposals will be received at this office until 12 m., on the 6th day of June, 1883, for furnishing and fixing in place, complete, the Iron Roofs, Attic floor, beams, etc., required for the Custom House and Post Office building at *Kansas City, Mo.*, in accordance with drawings and specification, copies of which, and any additional information, may be had on application at this office or the office of the Superintendent. JAS. G. HILL,
Supervising Architect.

CITY COMMISSIONER'S OFFICE, BALTIMORE, *May* 22, 1883.

Proposals will be received until June 6, 1883, at 1 P. M., for furnishing 1,000,000 granite paving blocks.

Proposals will be received by the American Committee of the Statue of Liberty, 171 Broadway, until 28th inst., for demolishing the brick buildings on Bedloe's Island, and the removal of the materials.

Proposals will be received by the Selectmen of the Town of Spencer, Mass., until June 21, for building about 50 man-holes and laying about 10,000 feet sewer pipe.

Proposals for furnishing stone for a lock in Big Sandy River, Ky., and W. Va., will be received until June 20, 1883.
CAPT. JAMES C. POST, *Engineer*,
82 *W. 3rd street, Cincinnati, O.*

Proposals will be received by Richelieu Bridge Co. until June 15, 1883, for building bridges over the Richelieu River, St. Thomas, Canada.

Will be received by the Depot of Public Works, Montreal, Canada, until June 17, 1883, for new roof over Drill Hall.

Proposals will be received by the Commissioners of Hamilton County, Ohio, until June 9, 1883, for improving the Carthage pike, from the gas tank to the Colored Asylum, Millcreek and Springfield Townships. Also, for improving the Carthage pike from the canal through St. Bernard, Millcreek Township.

Will be received by the City Clerk, Columbus, Ohio, until May 26, 1883, for furnishing materials and doing the following work, to wit, Friend street; from the west side of Ohio avenue to Rose avenue, by grading and graveling the roadway.

Proposals will be received by the City Clerk, Columbus, Ohio, until June 11, 1883, for furnishing materials and doing the following work, to wit: For completing the work of constructing the brick sewer known as the "Northwest Main Trunk Sewer," in the City of Columbus.

Proposals will be received by the Commissioners of Hamilton County, O., until June 9, 1883, for building a wrought-iron girder bridge on Carthage pike, near Clinton Springs avenue, Millcreek Township.

For the erection of a soldiers' monument until August 1st. Address S. E. Merwin, New Haven, Conn.

Proposals will be received at the office of the Superintendent of the Institution for the Deaf and Dumb, at Columbus, O., till 8 o'clock, A.M., of Saturday, June 9, for the following work: For reconstructing the heating apparatus now in use; for constructing new cold air ducts; for completing ventilating or foul air ducts.

Proposals will be received until 12 o'clock Wednesday, June 6, 1883, for furnishing and laying about 90,000 feet pipe, assorted sizes, with fittings, hydrants and valves; also pumping machinery, water wheel, etc., also for stone building. Specifications can be had of
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For the erection of a memorial column at Washington's Headquarters, at Newburgh, N. Y., will be received until June 12, 1883. For information address
LT.-COL. THOS. LINCOLN CASEY,
Washington, D. C.

Proposals will be received at the office of the Auditor of Franklin County, Columbus, Ohio, until Wednesday, June 13, 1883.

For the following items for the new Infirmary:

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For repairing and replanking Pier No. 2, Washington avenue, Wallabout Basin, Brooklyn, will be received until June 1, 1883. For information address RIPLEY ROPES,
Commissioner, Brooklyn, N. Y.

Proposals will be received at the office of the City Clerk, Columbus, Ohio, until June 9, 1883, at 12 o'clock, noon, for furnishing materials and doing the following work, to wit: For completing the work of constructing the brick sewer known as the "Northeast Main Trunk Sewer," in the city of Columbus.

For furnishing materials and building a town hall will be received until June 4, 1883. Address D. W. BINDER, *Clerk*,
Mt. Sterling, Ohio.

For material and work in connection with the building of a Water Works, will be received by R. P. KENNEDY,
President Board Trustees, Bellefontaine, Ohio.

For the erection of a Court House, at Newport, Ky., will be received until June 11, 1883. For information address the Commissioners.

For the erection of the south wing and corridor of the main building of Kansas State Agricultural College, will be received until June 4, 1883. Separate bids are requested upon the various branches of work and upon the structure complete. Address
GEO. T. FAIRCHILD, *Secretary, Etc.*,
Manhattan, Kansas.

For the removal of rocks in Georgetown Harbor, D. C., will be received until June 6, 1883, by *Maj.* P. C. HAINES,
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For the graduation and masonry on 27 miles of the Maryland Division and 33 miles of the Delaware Division will be received until June 10, 1883. For information address
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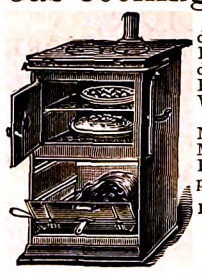

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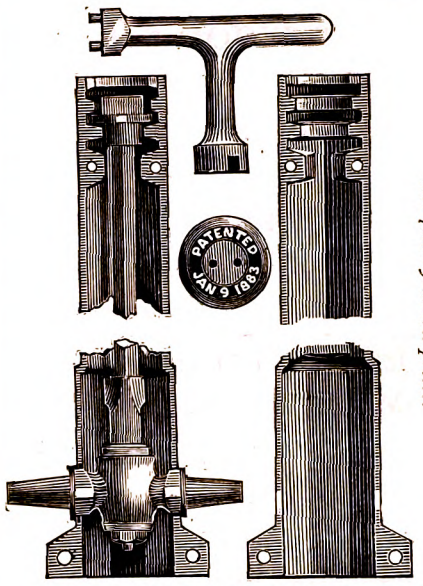

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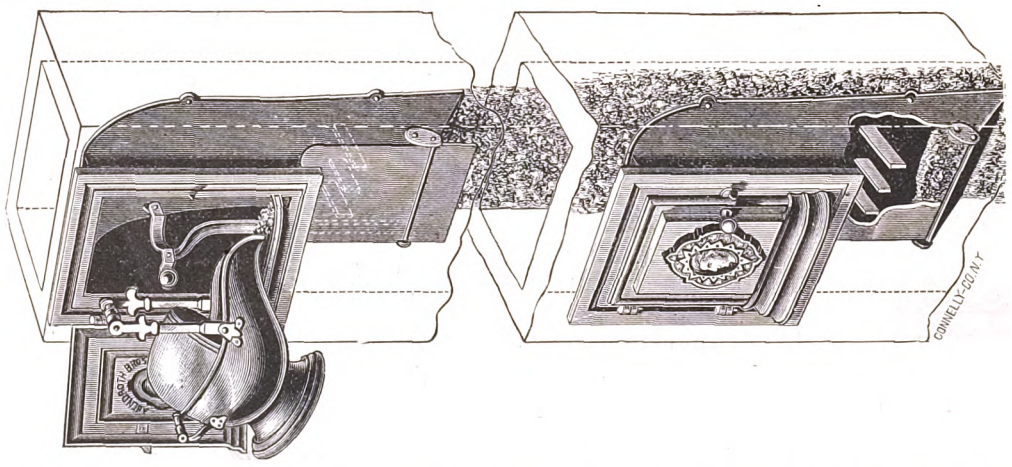

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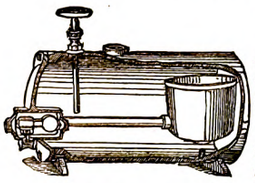

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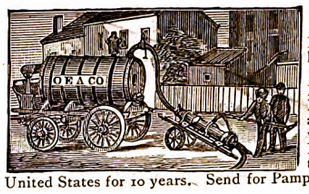

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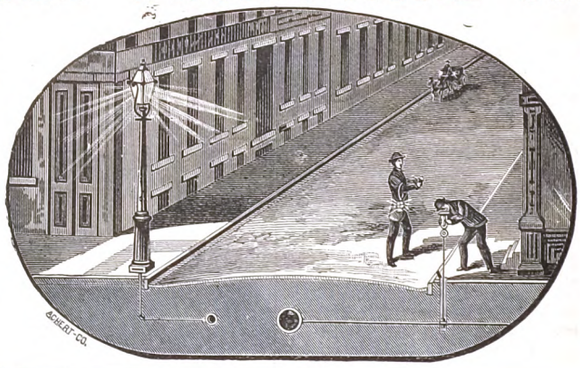

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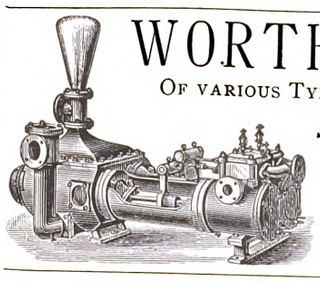

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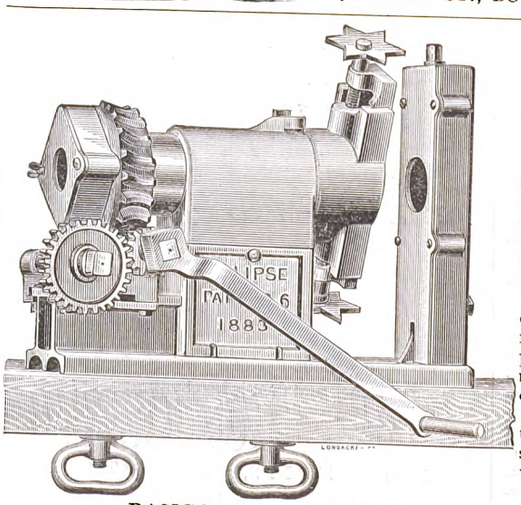

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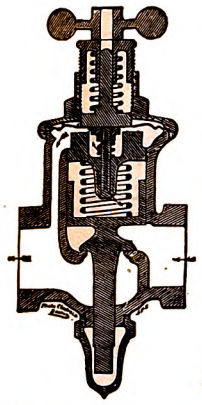

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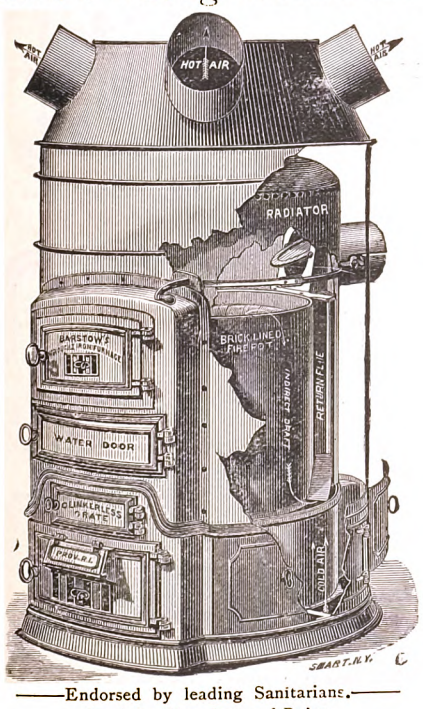

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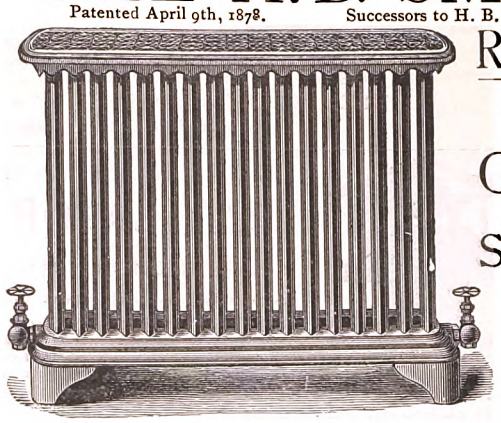

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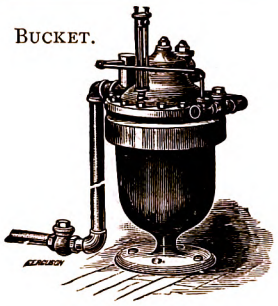

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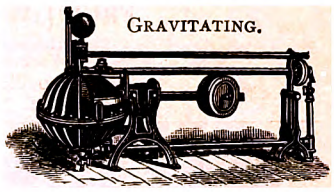

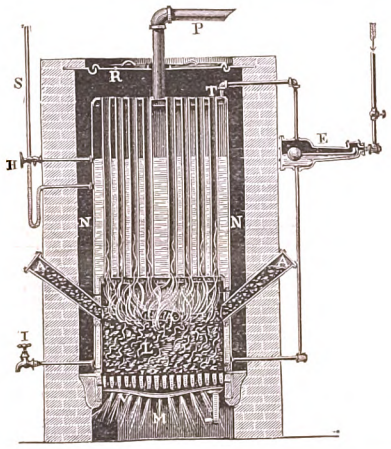

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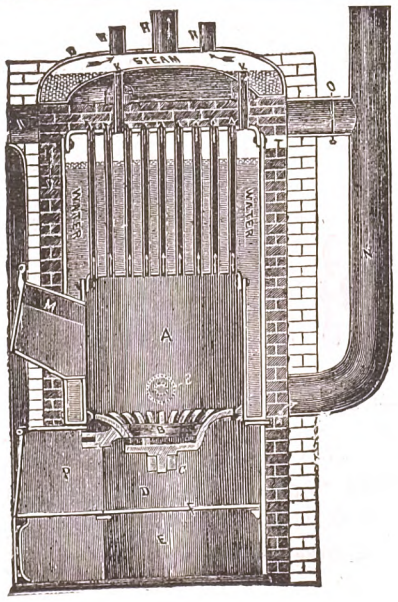

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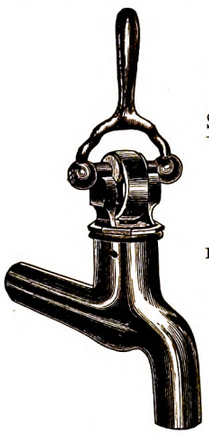

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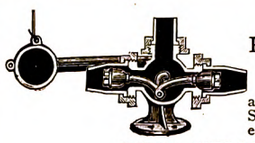

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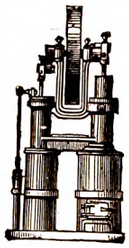

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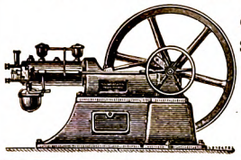

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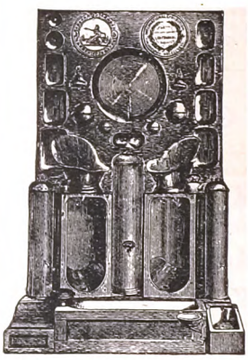

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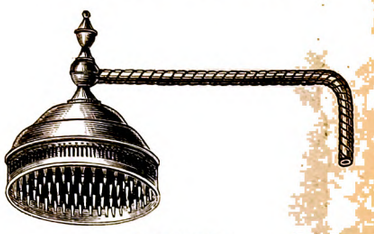

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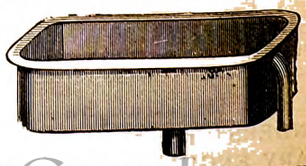

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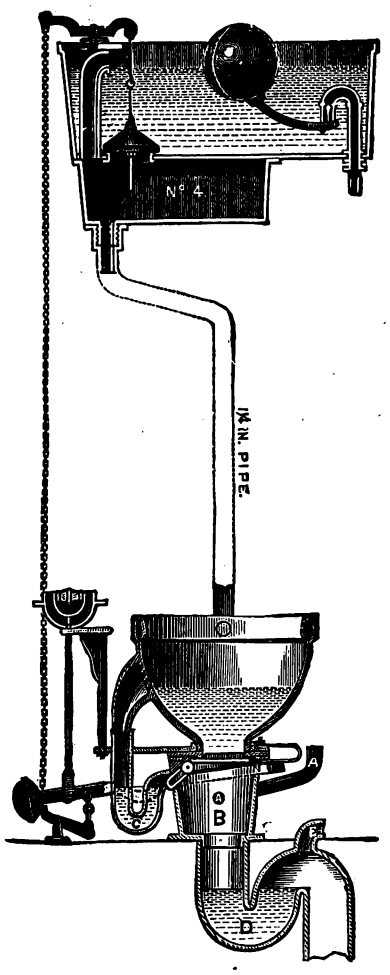
With the Cistern from which it is supplied, a pair of Brackets, the Floor Lever Chain and necessary fittings, except the lead pipe and trap.



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(Is the same as No. 2, with the addition of a service box of a size adapted for use over a pan closet.)

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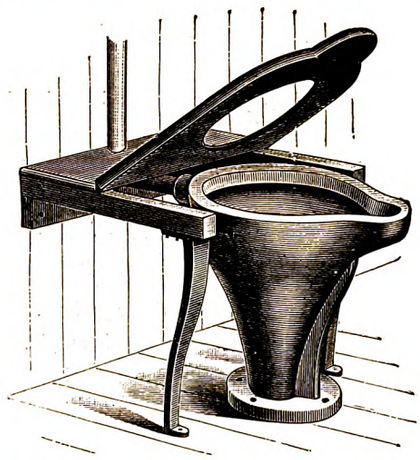

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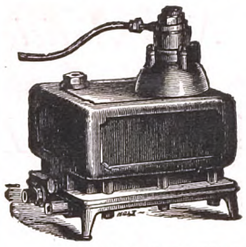

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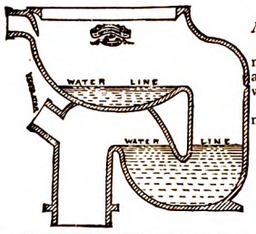

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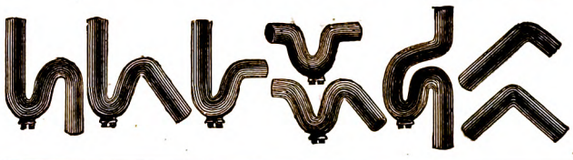

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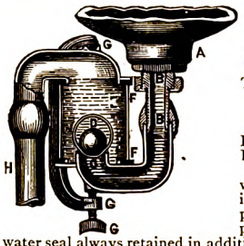

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It is a perfect seal with or without water. Every time a basin of water is discharged, the trap and adjoining pipes are thoroughly cleaned by syphonage. Two to three inches of water seal always retained in addition to valve seal. Trap may be set close to basin, or any distance from it with same result. Compact and neat in appearance, light in weight. Universal in its application, cannot become clogged. Simple, cheap, durable and easily adjusted. Glass or metal section furnished at same price. Send for circular and price list.

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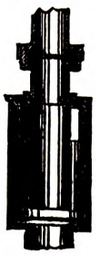
Is guaranteed to shut out foul gases, tide water, regurgitation and rats from entering buildings. A valve and proper ventilation is indispensable. With front vent sealed, this Trap successfully resisted illuminating gas pressure. Tested by Dr. A. M. Jacobus, as experimented by Prof. Doremus, upon a block of stone and an 8-inch brick wall. Country residences, hotels and public buildings connected with drains and cesspools, are made safe with my Trap. By removing cover, access is had the whole length of the drain without cutting pipes Architects, Engineers, Plumbers and Builders, send for descriptive circulars. Trade supplied. Agents wanted. WM. BEDELL, Builder, 985 8th Ave., N.Y.



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Water seal always perfect.

Made of Brass, Porcelain or glass. When of Glass, the workings and benefits of the invention are plainly seen. Send for illustrated Circular. Address,

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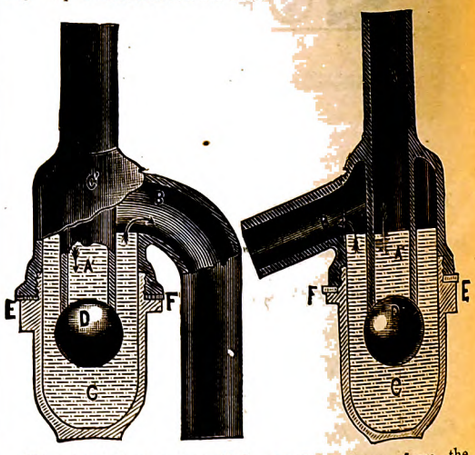

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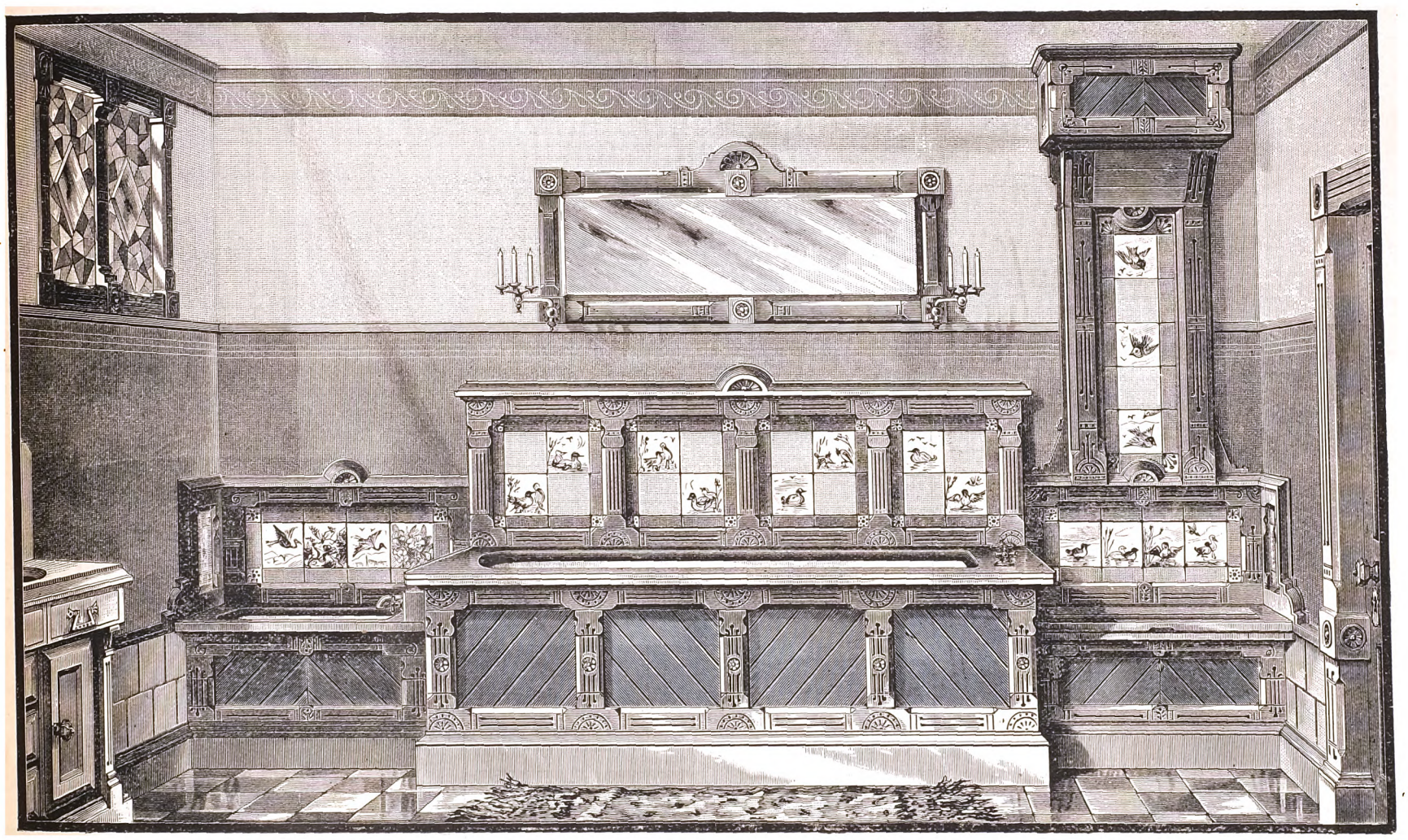

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THE SANITARY ENGINEER.

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The following are a few of the many articles of permanent interest:

Illustrated descriptions of the plumbing work in the well-known residences of Messrs. Wm. K. Vanderbilt, Cornelius Vanderbilt, Ex-Gov. Samuel J. Tilden, John Sloane. Also of the "Mills Building" (the largest office building in New York) and Minot, Hooper & Co.'s Commercial Buildings. A Russian Bath Establishment in Boston and the St. James Hotel in Baltimore.

"Berlin Sewerage." An elaborate report of the system just completed, with illustrations. By M. A. Durand-Claye, Engineer-in-Chief of Bridges and Roads of Paris.

"Trap Syphonage." Report with illustration of experiments for National Board of Health. By Edw. S. Philbrick and E. W. Bowditch. Also by Col. Geo. E. Waring, Jr. Also in England by S. S. Hellyer, Esq. Interesting and valuable data.

"Coverings for Steam Pipes." Results of Some Experiments. By Mr. M. J. Bird.

"The Health of Boys' Boarding Schools." By D. F. Lincoln, M.D.

Weekly "Mortality Returns" of the leading cities in the United States, with "Notes and Abstracts" from reports of Health Officers and correspondents of the National Board of Health. There have been printed each week beginning with issue of Oct. 12.

"Tin in Canned Fruits." By Prof. Albert B. Prescott.

"Negro Mortality of Memphis." By Dr. G. B. Thornton.

"Pullman Sewerage." Abstract of paper describing it. By Benezette Williams, C.E., Engineer in charge.

"Letters to a Young Architect on Heating and Ventilation." By Dr. J. S. Billings, Surgeon, U.S.A.

A model plan for an "Improved Tenement for Working Men in New York."

"Burning of Town Refuse at Leeds. A paper by Chas. Slagg, Assistant C.E.

"The Relative Uses of Gas and Electricity." By C. Wm. Siemens, F.R.S.

"Heat, House Plumbing and Mortality." By Lewis M. Leeds.

"The Management of Heating Apparatus." By Edw. S. Philbrick, C.E.

An extract from a paper by S. S. Hellyer on the "Unsealing of Traps by Momentum"—interesting in connection with experiments made by Messrs. Philbrick and Bowditch, and Col. Geo. E. Waring.

"Water Waste Prevention."

"Regulation of Exeter Water Works." A paper by Geo. I. Deacon, M. Inst. C.E., read before Society of Arts.

"Report of Boston Committee," and report of results in Cincinnati.

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